A Satyam Roychowdhury initiative

EXPLORING ANXIETY, DEPRESSION AND FATIGUE IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) PATIENTS WITH PRE-TREATMENT AND POST- TREATMENT

This dissertation is submitted for the partial fulfilment for the degree of

M.SC IN APPLIED PSYCHOLOGY (SPECIALIZATION IN CLINICAL PSYCHOLOGY)

SISTER NIVEDITA UNIVERSITY

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CERTIFICATE

This is to certify that the dissertation entitled "Exploring anxiety, depression and fatigue in Chronic Obstructive Pulmonary Disease (COPD) patients with pre-treatment and post treatment", submitted by Lumbini Surai, a 2nd year M.Sc. student in Clinical Psychology, from Sister Nivedita University, is a Bonafide work, which may be placed before the board of examiners for their evaluation. This is in partial fulfilment for the Degree of M.Sc. in Clinical Psychology, Sister Nivedita University.

This is an original study done by the candidate and has not been submitted by her before any form for any other degree of this University or any other University.

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PLAGIARISM CERTIFICATE

"I LUMBINI SURAI, hereby declare that the research work titled, "Exploring anxiety, depression and fatigue in Chronic Obstructive Pulmonary Disease (COPD) patients with pre-treatment and post treatment", conducted by me, has been completed with full honesty and integrity. I confirm that the work is original, and all sources of information have been appropriately acknowledged and cited. Furthermore, I take full responsibility for the content and findings presented in this research".

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Year: 2025

ACKNOWLEDGEMENT

I am proudly grateful to a number of individuals whose support and guidance have been invaluable in the completion of this research study.

First and foremost, I extend my deepest gratitude to my parents, Mimi and Bubu. Their unwavering love, patience, and encouragement have been my guiding light throughout this journey. Your faith in my abilities and endless support have given me the strength on which I built my academic endeavours. I also express my warm gratitude to my sister, for her unwavering support, feedback or suggestions during the phases. Whenever I needed some help, she always stands by my side. I always thankful to her and my parents for believing in me, for the sacrifices they have made, and for always being pillars of my strength.

I am obliged to have a professor like Papri Das Bose ma'am. She was my first research guide. Without her, my research topic would never be this, and I would never have gotten the chance to understand this area of research. I have learned so much from her. Her help and guidance supported me in doing this research.

I am also grateful to have a good and supportive friend like Saheli Paul, she is my batchmate. Your encouragement and help in my dissertation process I will never forget. Your constant support during any confusion regarding this whole process helped me to overcome those obstacles. Thank you for believing in me.

I am immensely grateful to my research guide, Professor Shrestha Ash. Your expertise, insightful feedback, and constant encouragement have been crucial to the success of this study. Your dedication to my process, from the initial stages to the final stages of writing, has been immensely motivating. Thank you for your patience, for challenging me to push the boundaries of my understanding, and for your unwavering support.

I would also like to express my sincere gratitude to Dr. Partha Sarathi Bhattacharyya (Institute of Pulmocare & Research). Without his support and guidance, I would never have completed the data collection process. He helped me communicate with the patients, and his constant support during my data collection process helped me to successfully conduct my research.

Finally, I extend my gratitude to anyone who has, directly or indirectly, supported me in this endeavour. Thank you all for your support, guidance, and encouragement.

DATE: 30/04/25. Lumbini Swain

ABSTRACT

The concept of "health is wealth" signifies that an individual who is healthy from within and happy on the outside can enjoy life more fully than anyone else. Every day, we face various obstacles and breakdowns in our personal and professional lives. This becomes even more challenging when dealing with chronic diseases such as respiratory issues, lung problems, asthma, and Chronic Obstructive Pulmonary Disease (COPD). Health includes not only physical well-being but also mental well-being. Scientific evidence shows a strong connection between physical and mental health — each significantly impacts the other. Every individual, at some point in their life, may experience depression, anxiety, or fatigue. These issues are especially prevalent among older adults, who are more vulnerable to such conditions. The presence of chronic illnesses like COPD further increases this vulnerability.

To assess the extent of these conditions in COPD patients, this study aims to "Explore anxiety, depression, and fatigue in Chronic Obstructive Pulmonary Disease (COPD) patients before and after treatment." The sample was collected from the Institute of Pulmocare & Research, West Bengal, 700156. Patients aged between 30 and 80 years were included, though most participants were aged between 50 and 80 due to the chronic nature of COPD. Data collection took place between January and March, 2025. This was a pre and post treatment study utilizing a purposive sampling technique. COPD severity was measured using the COPD Assessment Test (CAT). Additional assessments included Pulmonary Function Test (PFT), 2 Chair Test (2CT), and 6-Minute Walk Test (6MWT). Depression was measured using the Beck Depression Inventory-II (BDI-II), anxiety was assessed with the Beck Anxiety Inventory (BAI), and fatigue was evaluated using the Fatigue Assessment Scale (FAS). Frailty or vulnerability to COPD was measured using the Clinical Frailty Scale (CFS). Statistical analysis was conducted using Jamovi software. A paired sample t-test was performed to assess differences in pre-treatment and post-treatment scores for everyone. Spearman correlation analysis was used to explore relationships between variables.

The results showed significant differences in CAT, depression, anxiety, and fatigue scores before and after treatment. A significant relationship was also found between substance abuse (before and after treatment) and the development of COPD. However, no significant relationship was found between CAT scores and frailty scores before and after treatment. In conclusion, it is evident that older individuals with chronic conditions like COPD commonly experience depression, anxiety, and fatigue.

A major limitation of this study is that data were collected from only one institution — the Institute of Pulmocare & Research in Newtown, West Bengal (700156). The data collection period was limited, and the sample size was small (N = 30), as some patients were unwilling to provide their data. Also, there was no control over the number of treatment sessions given to the patients before and after the data collection procedure. This study recommends further research on COPD patients to gain a deeper understanding of comorbid conditions that may contribute to the development and progression of COPD.

Keywords: Chronic Obstructive Pulmonary Disease (COPD), Before and after treatment, COPD Assessment Test (CAT), depression, anxiety, Fatigue Assessment Test (FAS).

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INTRODUCTION

INTRODUCTION

An individual with a free mind, good health, better well- being with a healthy lifestyle remains successful and healthy also in their lifetime. In today's world, every individual is busy with their workloads, hustling to feed their family and following a path that may fulfill their journey to a successful ending. Every individual from children, adolescents, adults and older adults needs to take care of their lifestyle, and their habits. In this modern world, it is evident that almost everyone is suffering from some chronic or some sort of critical illness. Though it is not only on their social or environmental factors it includes every factor like their health which includes mental and physical safety, and security. A psychologically healthy person can overcome all kinds of problems in their life. An individual with a free mind can overcome all obstacles in their life. There is much evidence that most chronic illnesses become more critical when the individual's own belief and motivation to live becomes low for themselves. It not only depends on their thinking but also their family support, loved ones, and proper caring person's behaviours. The way of treating a patient who has any kind of chronic illness is related to their health. Therefore, health according to the World Health Organization (WHO, 1948), is a state of complete physical, mental and social well-being. By this, it is evident that an individual's health is related to their surroundings not only to their own body or mind. How their family members are treating them and how much social support they have is also an important factor.

There is a link between our mental health and physical health. If a person is having too much stress in the workplace or having any kind of separation from their partner or loss, the person automatically becomes depressed, likes to be alone and also their sleeping pattern and eating schedules get changed, either they eat too much or too minimum or even they get hypersomnia or insomnia. Automatically these kinds of mental health changes can harm a person's physical health. Therefore, health is also an important concern that everyone should know because there are many societies or cultural beliefs where that deny the link between physical and mental health is interconnected. Health psychology as defined by Matarazzo, 1980, is an aggregate of the specific educational, scientific and professional contributions of the discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness, the identification of etiologic and diagnostic correlates of health, illness and related dysfunction and the analysis and improvement of the healthcare system and health policy formation. When a person is having any chronic illness that should be recognized by them and the treatment process should start properly. While treating a person who is having any chronic illness it is important to notice that their well-being should not get worse. Well-being is also related to the health outcomes of an individual because well-being includes a person's overall physical, mental and emotional aspects. Physical well-being involves maintaining good nutrition, food intake balance, and a proper sleeping schedule, Mental well-being includes not taking stress too much, building resilience, and wisdom, doing meditation or any activities that can evolve our mental health, Emotional well-being involves maintaining a healthy relationship with others, being empathetic to others, being compassionate to oneself and others, Social well-being may include staying connected with others, involving with societal work, doing extra-curricular activities etc.

Well-being and health are well connected. If an individual's well-being is getting disturbed, he/she may face many physical, and psychological issues to deal with. Individuals may face depressive symptoms, being panicky in every moment, staying fearful of everything or being isolated from everyone. These may worsen if the well-being gets restored properly. People who have breathing problems like Asthma, Chronic Obstructive Pulmonary Disease or any other kind of respiratory disease may get worse if they face any disturbances in their health and well-being. A pulmonary disease that affects the lungs and a person's respiratory system. It can be caused by any infection, especially if the person has been a smoker for many years or has any family members who have the same problem and may develop the same disease. One of the severe problems in pulmonary disease is called Chronic Obstructive Pulmonary Disease (COPD). It is a disease where the lung gets highly infected airflow gets restricted and the person has trouble breathing properly, it includes Emphysema and Chronic Bronchitis. These diseases are fatal. In 2020, COPD was the third most common cause of death (according to WHO). COPD is a condition that gets worse if it's not treated or maintained with proper medications. There are certain symptoms that a person can face who is having COPD. They face trouble catching breath, especially during physical activities, Wheezing or whistling sounds when breathing, chest tightness or heaviness, frequent lung infections, coughing more often, having mucus while coughing or changing in colour of the mucus. In 1964, the term Chronic Obstructive Pulmonary Disease, COPD was first mentioned by Mitchell in the USA (Mitchell et al., 1964).

During the following years, there was much confusion in terminology, like Chronic Obstructive Lung Disease (COLD), Chronic Obstructive Airway Disease (COAD), and Chronic Obstructive Respiratory Disease (CORD), These all were used synonymously with chronic bronchitis and emphysema. In the 1980's the term COPD was used by researchers and in the 1990's it became common in physicians in respiratory medicine. For developing different guidelines for diagnosing and treating COPD many national and international discussions were ongoing from 1980's to 1990's. At that time certain guidelines or management of COPD were published. The most well-known ATS (American Thoracic Society, 1995) is the European Thoracic Society (ERS) (Siafakas et al, 1995). And the British Thoracic Society (BTS, 1997) gave the guidelines for COPD. After some years, the US Lung, Heart and Blood Institute (the NHLBI) together with the World Health Organization (WHO) founded the Global Initiative for Chronic Obstructive Lung Disease (GOLD), the international guideline for COPD. (Pauwels et al., 2001). There are certain guidelines given by these societies. According to ATS guidelines, COPD is "…a disease characterized by the presence of airflow obstruction due to chronic bronchitis or emphysema; the airflow obstruction is generally progressive, may be accompanied by airflow hyperreactivity, and may be partially reversible". Further, "COPD may include a significant reversible component and some patients with asthma may go on to develop irreversible airflow obstruction indistinguishable from COPD". Chronic Bronchitis is defined in clinical terms and emphysema in terms of anatomic pathology (American Thoracic Society, 1995). According to ERS guidelines, COPD is "…a disorder characterized by reduced maximum expiratory flow and slow forced emptying of the lungs; features which do not change markedly over several months. Most of the airflow limitation is slowly progressive and irreversible. The airflow limitation is due to varying combinations of airway disease and emphysema; the relative contribution of the two processes are difficult to define in vivo"… Emphysema is defined anatomically, and chronic bronchitis is defined clinically. Further, the guidelines state that"… the most difficult problem is distinguishing COPD from chronic

airflow limitation of chronic asthma in order subjects". Also, "the distinction may sometimes be impossible…". (Siafakas et al, 1995). According to the ATS/ERS standards, "COPD is a preventable and treatable disease state characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and is associated with an abnormal inflammatory response of the lungs to noxious particles or gases, primarily caused by cigarette smoking. Although COPD affects the lungs, it also produces significant systemic consequences" (Celli et al, 2004). The NICE guidelines (Chronic Obstructive Pulmonary Disease,2004) "COPD is characterized by airflow obstruction. The airflow obstruction is usually progressive, not fully reversible and does not change markedly over several months. This disease is predominantly caused by smoking." These above-mentioned guidelines are followed during the management and treatment of COPD. Now it has become a worldwide problem of death, especially if a person has a smoking habit. Smoking is one of the main reasons because cigarettes are always easily available everywhere. There is another comorbid disease which is called dyspnoea or shortness of breath that a person may experience before having COPD. In this problem, the person can feel tightness in the chest and may try harder to breathe properly. Dyspnoea also includes allergies, if anyone has an allergy to dust or any kind of food, having anxiety prone to every situation may lead to experiencing this as well as COPD if the person has any other preoccupation.

However, it is also evident that COPD or any respiratory problems are sometimes primarily related to mental health or sometimes a person's psychological health plays a comorbid role in developing this disease and without maintaining a proper treatment approach it can get worse. Fatigue is also very related to these symptoms when an individual is experiencing depressive symptoms and having anxiety in any situation. Fatigue is a subjective feeling of tiredness that a person can face. When a person has such a chronic disease, they may feel fatigued most of the time when it appears most frequently like coughing, breathlessness, etc. There is a certain definition that can explain it properly. For experiencing fatigue there can be many other factors related to it that can influence the severity of fatigue in an individual. Fatigue in patients with COPD is often neglected (Lewko et al. 2009). The etiology and mechanisms responsible for fatigue are probably complex and multifactorial and are currently not fully understood (Davis & Walsh, 2010). According to the definition by Ream & Richardson, fatigue is a multidimensional phenomenon: a 'subjective, unpleasant symptom that incorporates total body feelings ranging from tiredness to exhaustion creating an unrelenting overall condition, which interferes with individuals' ability to function to their normal capacity' (Ream & Richardson, 1996). According to many studies, fatigue is sometimes ignored by the caregiver and the individual himself/herself because it becomes a normal day-to-day symptom. Fatigue is also related to some psychological factors if a person feels low physically there is a high chance that the person will feel exhausted mentally. It can impair the attention, concentration, will of a person to do something or the urge to be involved in new experiences.

To determine a patient's vulnerability in a chronic illness or how much that individual is suffering from that disease is determined easily by using the Clinical Frailty Scale (CFS). Researchers described frailty as a geriatric syndrome characterized by increased vulnerability to stressors due to age-related declines in multiple physiological systems, leading to a reduced ability to cope with everyday or acute stressors. According to Fried et al. (2001), Frailty is a clinically recognizable state of increased vulnerability resulting from aging-associated decline in reserve and function across multiple physiologic systems such that the ability to cope with

everyday or acute stressors is compromised. There are certain frailty criteria by which we can understand the individual's health problems. That includes significant weight loss, feelings of exhaustion, unable to do much physically, becoming slow in every work, and feelings of weakness. The patients who have COPD are more vulnerable and they will fall under these criteria significantly. The clinical Frailty Scale was introduced in the second clinical examination of the Canadian Study of Health and Aging (CSHA) as a way to summarize the overall level of fitness or frailty of an older adult after they had been evaluated by an experienced clinician (Rockwood et al..,2005). CFS has 1 to 9 levels, in 2020 the Clinical Frailty Scale was revised with some changes as it was required for descriptions. It changed from "well" to "fit" in level 2, "vulnerable" to "living with very mild frailty" in level 4 and levels 5-8 were rested as "living with... mild, moderate, severe and very severe frailty" respectively (Rockwood & Theou, 2020). By using this it becomes easier to detect the health status of an individual who is suffering from any chronic illness.

Depression in COPD patients is mostly common due to many reasons, like their age, sex, socioeconomic status and support system. In depression, an individual loses his/her cognitive ability to understand the exact situation and they always find something or catch some comments, or talks that support their thoughts and emotions. Commonly, a clinically depressed individual will see their future hopelessly, find themselves helpless in every situation and think they are worthless in everything. In Chronic Obstructive Pulmonary Disease (COPD) when a person's lung function gets worse and sometimes it can make a person too vulnerable that the person needs someone's help to go out of their house or do any regular work like- go outside, do household chores, or long journeys. When a workaholic person is diagnosed with this kind of respiratory disease it is obvious that at some point the person might get depressed about his/her situation in life. Sometimes their health deteriorates because of their lifestyle and unawareness of these disease outcomes. Family situations, caregivers, and even societal acceptance also play a role in recovering from these chronic respiratory diseases. However, there is also a high chance of feeling depressed or having a low mood because of some medications and their side effects. However, it is more evident that though these kinds of respiratory diseases commonly happen to older adults or to those who had any addiction to smoking for many years or who had any family or genetic history of developing this kind of disease are highly prone to having COPD. Being depressed is a cause that sometimes leads to the disease to some extent more difficult to cure or a stable condition, because in a depressed mood a person's thought process becomes diminished which can lower the health situation of that individual.

COPD is a disease itself that creates many kinds of stress related to the situation of the patient, their socio-economic status and their lifestyle. It is very common and related that if a person is having a depressive mood or having depression it is more likely to have anxiety also. Anxiety levels can vary from person to person but it is clear that when someone is diagnosed with some chronic illness that needs to be taken care of very much and which needs to maintain a daily routine of lifestyle then tension, and anxiety can happen. Anxiety is the apprehension of future threat or danger that means thinking about something or feeling anxious about something that is yet to come and which is not definite will happen, but it is more prominent in elder people who are generally more tensed in any situation are mostly have anxiety when diagnosed with any chronic illness. Any chronic illness like any heart disease, asthma, COPD, cancer, diabetes, or arthritis these are generally not curable fully, these diseases need to be controlled to some

extent. To control this illness especially when it is a lung or heart-related illness the patient needs to control their lifestyle, their food habits, and even when they need to go out of their house take precautions. All of these are highly anxiety-provoking because the patient may be unaware of the fact that which act may worsen their illness condition when it is in the beginning. Generally, it is also normal to feel worried, nervous or anxious in older people who had never expected such illness and these illnesses need more caring and maintenance of lifestyle, which may not always everyone can do. That is why sometimes it gets worse and the patient feels more tense or anxious.

While considering this chronic illness it is obvious that depression, anxiety or even only fatigue is not common in an individual hence, all of these three problems can come which keeps more down the patient from their mental and physical health. When a patient is suffering from COPD, in the initial stage the patient's health becomes more vulnerable and weaker. The cough with phlegm is becoming very frequent. A person whose health is weak automatically feels agitated, and may get depressed and tensed about their health, also more commonly fatigue or tiredness becomes the first symptom of the patient. Karakurt (2012) studied the depression, anxiety and fatigue levels and daily living of those patients who have Chronic Obstructive Pulmonary Disease (COPD). According to this study, it is obvious that patients become weaker when they are diagnosed with COPD. More importantly, it is also evident that this disease worsens the daily living of the patients. Their efficiency of doing regular normal work becomes slower or even they can't just do those things. Research studies show that Dyspnoea which is shortness of breath, is also more common in those people who have COPD. Dyspnoea comes before the COPD problem, when breathing difficulty gets more hampered or the patient can't properly take the inhaler then it can make the health of the patient worse. When a person is feeling tired then automatically his/her thinking level gets blocked and all negative or dimmed ideas come forward and are a high chance that the person may then feel more anxious, tensed or nervous about their health. A depressive mind can't think or judge correctly about anything. The feeling of fatigue also comes with the age of the patient primarily, but while diagnosing such chronic levels of respiratory disease it is normal that they will feel more fatigue or tiredness than others. The feeling of worthlessness, sadness, and problems in making decisions come after when an aged person feels they are now restricted from many works, along with these they might not be involved with those activities that are enjoyable to them. Along with these things, they may feel anxious or get more scared when it comes to their family, shake in legs or tremble in hands during any serious discussion, breathing difficulty is more normal during any anxious situation and sometimes they might sweat hot/cold. In older people, it is quite obvious that they face all other physical symptoms of weakness and if other chronic illnesses exist then the weakness becomes more crucial, and fatigue will become high. The person may feel mental or physical fatigue. They face problems while thinking about work or they can't even stay at work for a long time. The concentration becomes weaker day by day. Mental and physical fatigue is more connected to each other because it is normal that if someone is not mentally interested in any work then physically the person will not be able to carry the loads of that work and vice versa.

Though COPD is now a worldwide chronic disease from which many people have died, it needs to be taken care of, at least in a manageable condition. A person who has been a smoker for many years has a high chance of developing this chronic disease. Also, it has been studied in both genders and male smokers have a high chance of having this chronic illness it is also noticed that female patients are more likely to have depression, anxiety and fatigue than male

patients. Hence, COPD is such a chronic illness that diagnosing such an illness itself creates anxiety in patients about the outcome of their health and along with their ages and other circumstances creates more fatigue levels in them and depressive symptoms are common while a person is feeling tired or anxious about their health. Thus, COPD itself is a respiratory illness that creates anxiety, depression and fatigue in patients and it is more common in older people that is also a reason that a person may feel more physical and mental challenges to cope with this illness.

There are many studies where depression, anxiety and fatigue have been explored in COPD patients. However, there are significant differences and correlations when any medications or treatment is going on to those patients. Thus, this study aims to explore anxiety, depression and fatigue in COPD patients with pre- and post-treatment.

LITERATURE REVIEW

REVIEW OF LITERATURE

ANXIETY AND COPD

A study conducted by Christiansen et al., (2023), among COPD patients was aimed to gain an understanding of the patient's experiences of anxiety who had COPD and propose a construct model. This study adheres to the PRISMA 2020 guidelines and it is based on Thomas & Hardsen's Thematic Synthesis Approach. These all studies used qualitative analysis including grounded theory, phenomenology, hermeneutics, and social constructivist approaches. The patients involved in this study are the majority of them from five different countries. To determine the COPD related anxiety, they used a scale called the Breathlessness Catastrophizing Scale, and the Interpretation of Breathing Problems Questionnaire. The result of this study shows that when any COPD-related anxiety triggers it has been maintained and became worsened by internal external or some behavioral maintaining factors. Some non-pharmacological interventions, which include pulmonary rehabilitation programs and psychological interventions showed improvement in exercise capacity, dyspnoea, emotional functioning, health-related quality of life, general anxiety symptoms, and COPD-related anxiety. There are certain limitations to this study. Firstly, the result was based on heterogeneous samples in terms of their sociodemographic characteristics, secondly, caregivers' and health care professional's experiences were not included. Thirdly, exploring COPD-related anxiety was to be the primary focus of all the included studies. Also, this study suggested that in the future there need to work on improving the identification of anxiety disorders, differentiate comorbid and subclinical anxiety patterns and finally develop a treatment plan.

Another research conducted by Eisner et al., (2010), aimed to define the role of anxiety in COPD patients that studied an inter-relationship between anxiety and COPD in a larger cohort group including control groups. They included the FLOW (function, living, outcomes & work) study of COPD. They included COPD patients who were stable by using medications, and the control groups included in this study were 302 subjects, matching their age, sex, and ethnicity. For measuring anxiety, they used the Hospital Anxiety and Depression Scale (HAD-S). It has 7 items measuring anxiety and the score ranges from 0-21, the higher score indicates a higher level of anxiety. The COPD severity was measured by overall five aspects: respiratory symptoms, systemic corticosteroid use, other COPD medication use, intubation for respiratory disease of home oxygen use. Possible total scores range from 0-35, higher score denotes more severe COPD. This study also includes the BODE Index, the degree of airflow obstruction (O) measured by Forced Expiratory Volume, Grade of dyspnoea(D) assessed by the modified Medical Research Council (MRC) Dyspnoea Scale & exercise capacity (E) measured by six-minute walk test, for each of item total score ranges from 0-10 points (high score means greater severity). For assessing the respiratory problem, they used the American Thoracic Society (ATS) Guidelines. The result shows that greater disease severity is highly related to proven anxiety in the patients. It is also noticed that a higher risk of dyspnoea can increase the risk of anxiety. The BODE Index shows that the COPD severity score is highly associated with anxiety. This study reinforces the fact that anxiety hurts COPD patients. The limitations of this study suggest that the researchers were not able to measure the changes in anxiety patterns over time or there may be some miscalculations of COPD. They suggested that further research

should determine whether proper treatment of anxiety can decrease the severity of COPD or not.

DEPRESSION AND COPD

The study conducted by Matte et al., (2016), aimed to understand the association of depression with COPD. This study aims to study the prevalence of depression in COPD patients and control groups to understand and explore the remaining causes of previously studied research. This study was a controlled study including more than 100 participants, the subjects were selected from outpatient clinics. This study included participants who were in continuous oxygen therapy and recovering from any exacerbation. They selected from Cohort Studies (n=3) from primary care (n=2) and tertiary care (n=2). Controls were matched by age, and gender with COPD patients. For confirming COPD, they used a spirometry test and post bronchodilator test and depression was assessed by interviewing process and using the Hospital Anxiety and Depression Scale (HADS-D) and CFS-D. The Odds Ratio (OR) and depression in COPD patients were compared with the control patients. This research study shows a total of 1613 relevant studies but there is also large variability in country settings, matching and sampling. The criteria they selected for the study show a reduction of variability in depression, and it is also found that if COPD gets the depression can get high in those patients. This study has some strengths which include the patients they were selected with diagnosed COPD by spirometry test which reduced the chance of getting dissimilarities also to avoid spectrum bias they selected the patients who were receiving long-term oxygen therapy minimizing the environmental issues they only included hospital admitted patients. Certain limitations also exist in this study, that they included more than 100 participants which may in turn create some selection bias because they tested all those studies failed in one or more selection criteria and importantly, they only used the extraction of data from other published studies, thus, there is no need for patient's consent & other ethics approval that might create an unethical problem.

Another research performed by Schane et al., (2008), with COPD patients, aimed to study the prevalence of depressive symptoms in COPD using a depressive symptom complex inventory, secondly to determine if the prevalence of depressive symptoms identified in this sample is higher in patients with COPD when compared to other chronic conditions and thirdly, to identify the risk factors that are associated with depressive symptoms in persons with COPD. The total sample size of this study was 18,588, age range was 50 and older, they interviewed these subjects in the 2004 wave of the Health and Retirement Survey (HRS), a nationally representative population-based study. 1,736 patients reported having COPD. The depressive symptoms were assessed by using the Center for Epidemiologic Studies Depression eight-item scale (CES-D8), an eight-item scale that is an abridged version of the CES-D20. The statistical measures were done by weighted logistic regression to measure the prevalence of depression in COPD patients and without COPD patients and to minimize the analytical biases they combined the data in a STATA 9.2 using the ice package. The result showed that patients with COPD are more likely to be white, high weight, single, and currently, have smoking habits rather than those without COPD. They are more prone to have comorbid heart diseases like stroke, heart failure, hypertension, diabetes etc. 58% of persons with COPD complained of dyspnoea. The result also showed that persons with COPD had higher depressive symptoms than persons without COPD as well as they had a similar risk of depressive symptoms as

persons who had congestive heart failure. Respiratory issues are the main predator of having more depressive symptoms even after adjusting for other factors, dyspnoea and difficulty in walking were major factors that are associated with depression in COPD patients. The strengths of this study were that it supports the association between COPD and depressive symptoms, and there is a connection between smoking and COPD also but depression can further provoke someone to smoke. The limitations of this study were that the diagnosis of COPD was confirmed by self-report but not any spirometry tests, while they were assessing the depressive symptoms by using questionnaires further psychometric assessments were done for formal diagnosing the clinical depression, little data exist on outcomes in COPD patients with co-morbid depressive symptoms who undergo either pharmacological treatment or psychiatric counselling, and the HRS does not provide specific information on pharmacologic treatment for depressive symptoms in patients who carry the diagnosis of clinical depression. Lastly, this study used a cross-sectional design, which described associations but not causal relationships. Regardless of the limitations, the risk factors were strongly and independently associated with depressive symptoms in COPD patients.

FATIGUE AND COPD

A study conducted by Ebadi et al., (2021), on COPD patients, aimed to gain knowledge about physical, psychological, social and behavioural factors related to fatigue that affects the COPD patients in their quality of life. Lewko et al. reported in 2012 that a combination of exercise capacity, muscle strength, airflow limitation, depression, dyspnoea and sleep quality is associated with fatigue in patients with COPD. The sample size was 2118 patients with COPD. It was a cross-sectional study, randomization, and control trials were done, fatigue was used as a primary outcome of the study. To measure fatigue, the participants were asked about age, gender, marital status etc, In disease severity factors associated with fatigue they included degree of airflow limitation, dyspnoea, and number of comorbidities, In physical factors associated with fatigue they included exercise capacity & muscle strength and body composition, and for psychological factors associated with fatigue included the factors like depression, anxiety and quality of life, lastly for assessing fatigue they used the scale of CIS-fatigue. The results show that Women with COPD experience more fatigue than men, Lower educated patients experience significantly more fatigue than higher educated patients, and without a partner or widowed patients experience more fatigue than married or unmarried patients. Furthermore, in disease severity factor, they found poor or non-existing correlations, but for Dyspnoea nine studies reported moderate to strong significant associations with fatigue in COPD patients, and comorbid diseases like coronary artery disease, current heart failure, hypertension, depression, insomnia, history of cancer are associated with fatigue with high and low. In physical factors, they found moderate to strong correlations with fatigue but BMI and fatigue showed poor correlations, in psychological factors the high fatigue group has significantly higher depression scores than lower, and a moderate significant correlation between anxiety and quality of life. And mostly studies revealed that the prevalence of fatigue is higher in COPD patients rather than in controls, lastly, one study reported that the proportion of clinically relevant fatigue was higher in subjects with COPD than without COPD subjects (only in men). Patients with dyspnoea, depression, anxiety, and low quality of life showed moderate-to-strong associations with fatigue. Many studies are reporting moderate-to-strong associations between fatigue and depression, as well as between fatigue and anxiety. This

research has strengths as well which include that this study was conducted with proper methodology with data extraction and screening process done by two different researchers just to avoid bias the limitations of this study were that there were a variety of tools that have been used to measure fatigue that could lead a problem and no meta-analysis has been carried out and no quality assessment was carried out on included studies in this paper. The future scope of this study is that all the factors related to fatigue should be meta-analyzed and longitudinal studies should happen to explore if there is any specific factor present for fatigue or if it is an underlying process.

Another research conducted by Goërtz et al., (2019), compared the levels of fatigue in COPD patients and non-COPD patients to highlight the fatigue level, demographics, clinical features of this disease and the disease severity. It was a cross-sectional study; the patients who were included in this study were diagnosed by GOLD (Global Initiative for Chronic Obstructive Lung Disease) guidelines. A total number of 1290 patients were included including non-COPD patients. In this study fatigue was measured by the subjective fatigue subscale of the Checklist Individual Strength (CIS-Fatigue), it has eight items and is a seven-point Likert-type scale, with scores ranging from 8-56. They also collected data on those participants' BMI, smoking status, and sociodemographic status and for measuring COPD condition they used the COPD Assessment Test (CAT). To understand the difference in results between COPD and non-COPD patients they performed the Chi-Square test, Mann- Whitney test was used for independent groups, and they also performed a non-parametric Spearman's rank correlation. The result showed that severe fatigue is present in COPD patients, but it is poorly associated with airflow limitation of the patients, also they found no clear associations between fatigue and demographic details, clinical features & disease severity. There are certain limitations of this study, that this study classified 80% of the COPD patients which cannot generalize those who have mild- severe COPD, also this study only included secondary care of COPD which doesn't provide the idea about primary and tertiary care of COPD patients. Due to the nature of the analysis, it was not possible to gain information on the specific medication that was used by them which may give this study more insight to understand further relation with fatigue.

Further research done by Kentson et al., (2016), aimed to study COPD patients who have fatigue, to determining the influence of certain physiological, psychological and situational factors on the experience of fatigue in those patients and functional limitations due to fatigue in patients with stable chronic obstructive pulmonary disease (COPD). This study included 101 patients with COPD and 34 control subjects. The inclusion criteria of this study were patients diagnosed with COPD with post-bronchodilator and the exclusion criteria were those patients who had any lung disease, stroke or cancer. In this study the impact of fatigue in daily life was assessed by Fatigue Impact Scale (FIS), it has 40 items and three dimensions including physical, psychological and cognitive aspects, respectively. The health status of those COPD patients was assessed by St George's Respiratory Questionnaire (SGRQ) (Engstrom et al., 1998) it has 76 items and its score ranges from 0-100. Physiological measures were also assessed dynamic lung function test and further, they studied the experience of dyspnoea which was measured by the modified Medical Research Council (MRC) scale. It has five statements from different degrees and scores range from 0-4 and lastly, psychological measures like anxiety, depression was assessed also by using Hospital Anxiety and Depression Scale (HADS), which consists 14 items total and its, score ranges from 0-21. To understand the difference between COPD and non-COPD patients they performed the Chi-Square test and

Mann-Whitney U test and multiple regression was done to evaluate the independent nature of fatigue in COPD patients. The results showed that COPD patients had significantly higher scores in depression and dyspnoea symptoms, The patients with fatigue showed significantly greater limitations on their physical, and psychological functioning. The statistical data also showed that depression and insomnia are independently associated with fatigue in COPD patients. The result also shows that COPD patients have lower lung function, more dyspnoea and higher depression, anxiety and sleep disturbances. Dyspnoea is one of the reasons for fatigue in COPD patients as well and sleep disturbances are related to depression which can lead to fatigue in those patients. There are certain limitations of this study the impact of fatigue is not fully explained in this study and also maybe there are certain factors like anaemia, and sleep apnoea syndrome that may contribute to fatigue in patients which is not explored here and also excluded patients with diseases that had a contribution factor to fatigue.

ANXIETY, DEPRESSION & COPD

Research conducted by Biswas et al., (2017), with the aim of explore the assessment of depression and/or anxiety among stable COPD patients in a sub-urban locality of Eastern India. They used a questionnaire for measuring depression and anxiety named the Hamilton Depression Rating Scale (HAM-D) for depression and anxiety they used the State-Trait Anxiety Inventory (STAI), and COPD was assessed by the Clinical COPD Questionnaire (CCQ). They included the patients who were receiving treatment or diagnosed in any other hospital OP department and their exclusion criteria were if anyone had any exacerbation in the last two months excluding smoking, additionally, those who are taking antidepressants, anti-anxiety medicine, have diabetes, hypertension, liver problems etc are excluded from the study. Their study design was approved by the Institutional Ethics Committee. Their patient strength was 75, aged from 45-82 years. Amongst them, 32 patients had depression and anxiety, 37 of them had mild to moderate depression and 4 of them had severe depression as the result shows. These 75 participants participated in the 6-Minute Walk Test (6MWT) and found that there were no significant differences in depressive and non-depressive patients. Importantly, the CCQ score was found to be significantly high in COPD patients with depression in comparison to non-depressive patients. In this present study, it has been noticed that almost two-thirds of the patients with stable COPD were suffering from either depression or anxiety. Waseem SMA et al. found that male gender, high socioeconomic status, lower education and single patients were more associated with depression and on the other hand, females with high education and SES and single people are more likely to be anxious. This present was similar to findings conducted by Orlandi et al. (2016), who had found no association between depression and functional capacity of moderate to severe COPD patients. This study has certain limitations also that maybe there many such things as patients' walking patterns, physical exercise, habits, food habits, respiratory strength, and sleeping patterns are not fully explored which might give more information to this study.

Another research conducted by Kirkil et al. (2013), with the aim of exploring the prevalence of anxiety and depression symptoms among individuals with Chronic Obstructive Pulmonary Disease (COPD) and examined the associated factors influencing these mental health conditions. This study included 80 participants diagnosed with COPD based on GOLD guidelines, with pulmonary function tests conducted using spirometry. Participants were

categorized into three groups: stage II (moderate), stage III (severe), and stage IV (very severe COPD). The Beck Depression Inventory (BDI), consisting of 21 items rated on a 4-point scale (0-3), was employed to assess depressive symptoms. Additionally, the Hospital Anxiety and Depression Scale (HADS) was used to measure anxiety and depression, with 7 items for each condition scored between 0 and 21. Statistical analyses, including the Mann-Whitney U test, Chi-Square test, and Spearman correlation, were conducted using SPSS software. The findings revealed that depression was identified in 42 participants based on BDI scores and in 51 participants according to HADS. Moreover, anxiety and depression scores were notably higher in individuals with very severe COPD when compared to those with moderate COPD. Anxiety scores were also elevated in the severe COPD group relative to the mild group. The study highlighted that reduced physical functioning due to respiratory illness contributes to increased depression, with individuals aged 60-70 showing heightened depressive symptoms. While COPD is historically more common in men, it is increasingly affecting women, who also exhibit higher rates of anxiety and depression compared to men. A limitation of the study was the lack of evaluation of the sensitivity and specificity of BDI and HADS in COPD patients, as no alternative diagnostic methods were used to validate the presence or absence of anxiety and depression.

A study conducted by Yohannes et al. (2022) to investigate the symptoms of anxiety and depression in patients diagnosed with Chronic Obstructive Pulmonary Disease (COPD). Data for this research were sourced from the previously published Genetic Epidemiology of COPD (COPD Gene) study. The study involved 1,587 participants who were either current or former smokers, recruited from 21 centers across the United States. Participants without relevant reports were excluded from the research. To evaluate anxiety and depression, the Hospital Anxiety and Depression Scale (HADS) was employed, which includes two subscales with scores ranging from 0 to 21. COPD severity was assessed using the COPD Assessment Test (CAT), which consists of 8 items, each rated on a scale of 0 to 5, with a total score ranging from 0 to 40. Additional assessments included respiratory function tests, the Six-Minute Walk Test, Body Mass Index (BMI) measurement, records of daily cigarette consumption, and medication use. The analysis aimed to minimize bias by comparing results from the CAT and HADS. The findings indicated that one in five participants experienced either anxiety or depression, with half of these cases involving both conditions. COPD scores were found to have a positive correlation with anxiety and depression, although weaker correlations were observed with BMI, cigarette use, and medication use. Network analysis revealed a densely interconnected relationship among anxiety, depression, and COPD symptoms. Anxiety was strongly associated with severe respiratory issues, while depression was linked to low physical energy, slowness, and sadness. The results also showed that older adults faced a heightened risk of symptoms such as slowing, fear/panic, and anhedonia. Higher educational attainment was positively associated with sadness and slowness but negatively correlated with tension and worry. The study highlighted anxiety as a significant contributor to psychological distress in COPD patients. While the large sample size and inclusion of reliable variables strengthened the study's findings, limitations included the use of cross-sectional data in the network analysis, which did not establish causal relationships, and the focus on inter-subject variability rather than intra-subject differences. The researchers recommended extending future investigations to include other clinically relevant dimensions, such as cognitive dysfunction and suicidal ideation, for a more comprehensive understanding.

ANXIETY, DEPRESSION, FATIGUE AND COPD

Research conducted by Karakurt and Ünsal (2013), aimed to evaluating the levels of fatigue, anxiety, and depression in COPD patients. The study included COPD patients from two general hospitals in Turkey, with data collected between April and September 2010. Participants met the inclusion criteria of having COPD for at least six months and being hospitalized for two days or more. A total of 255 patients were involved in the study. To measure fatigue, the Visual Analogue Scale for Fatigue (VAS-F), developed by Lee et al., was utilized. This scale consists of two subscales: fatigue and energy, comprising 18 items with scores ranging from 0 to 10, where higher scores indicate greater fatigue intensity. Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS), designed by Zigmond and Snaith, which includes 14 items—seven each for anxiety (HADS-A) and depression (HADS-D)—scored on a 4-point scale, with subscale scores ranging from 0 to 21. Higher scores suggest a greater presence of anxiety and depression. Additionally, Katz's Index of Activities of Daily Living (ADLs) and Lawton and Brody's Index of Instrumental Activities of Daily Living (IADLs) were employed. Data were analyzed using SPSS software, with statistical methods including mean, median, mode, and independent sample t-tests. The results highlighted significant differences in fatigue and energy levels among married, unmarried, and widowed women. Female patients experienced higher fatigue and lower energy levels than males, with widowed individuals reporting more fatigue and less energy compared to their married and unmarried counterparts. Differences were also observed in ADLs among COPD patients based on gender, marital status, and educational background. Women exhibited heightened levels of fatigue, low energy, and elevated anxiety and depression. The study further revealed that older male patients were at higher risk of mortality compared to females. However, the study had certain limitations. As it focused solely on hospitalized COPD patients, the findings may not be apply to outpatient populations. Therefore, generalizing these results to other groups may not be justified.

METHODOLOGY

AIM OF THE STUDY

Exploring anxiety, depression and fatigue in Chronic Obstructive Pulmonary Disease (COPD) patients with pre and post treatment.

OBJECTIVES OF THE STUDY-

1. To assess the difference between in COPD scores of patients before and after treatment.
2. To assess the levels of anxiety, depression and fatigue in COPD patients before and after treatment.
3. To examine the relationship between frailty and COPD scores before and after treatment.
4. To explore differences inpatients having substance abuse and no substance abuse based on their COPD scores before and after treatment.

HYPOTHESIS OF THE STUDY

1. **Null hypothesis 1(Ho1**) = There will be no significant differences between COPD scores of patients before and after treatment.

2. **Null hypothesis 2(Ho2)** = There will be no significant difference in depression between COPD patients before and after treatment.

3. **Null hypothesis 3(Ho3)=** There will be no significant difference in anxiety between COPD patients before and after treatment.

4. **Null hypothesis 4(Ho4**)= There will be no significant difference in fatigue between COPD patients before and after treatment.

5. **Null hypothesis 5(Ho5)=** There will be no significant relationship between frailty and COPD scores of patients before treatment.

6. **Null hypothesis 6(Ho6)=** There will be no significant relationship between frailty and COPD scores of patients after treatment

7. **Null hypothesis7(Ho7) =** There will be no significant difference between COPD patients with and without substance dependence and their COPD scores before treatment.

8. **Null hypothesis8(Ho8)** = There will be no significant difference between COPD patients with and without substance dependence and their COPD scores after treatment.

VARIABLES UNDER THE STUDY

1. Depression
2. Anxiety
3. Fatigue

OPERATIONAL DEFINITIONS OF THE VARIABLES

Depression – Depression can be defined as a persistent state of low mood and loss of pleasure in daily activities, significantly impacting daily functioning and emotional well-being.

Anxiety- Anxiety is anticipation of future threat, tension and worry. It is often accompanied by physical symptoms like sweating, palpitation, heart pounding, nervousness etc, based from that anticipation of future threat or danger.

Fatigue- An extreme sense of tiredness, exhaustion or lack of energy that often impair one's ability to perform daily activities. A person with fatigue may feel weak, worn out, heavy, slow, or run down. Fatigue is described mostly in relationship with muscular force exhaustion as if following a strenuous exercise period and with no malaise.

PARTICIPANTS OF THE STUDY- The patients who are included in this study who were clinically diagnosed with Chronic Obstructive Pulmonary Disease (COPD) from the Institute of Pulmocare & Research clinic, West Bengal 700156. This research is done by a purposive sampling technique. The data collection process was done between 27th January 2025-13th March 2025.

The Inclusion Criteria-

Age range- The patients' age ranges between 30 – 80 years were included in this study.

Duration – The patients who have had COPD at least 6 months duration and are currently in the treatment process are included in this study.

Area- The patients who went to the Institute of Pulmocare & Research Clinic, West Bengal 700156 were included in this study.

Diagnosis – Only those patients who are clinically diagnosed with COPD are included in this study.

Medication- The patients who are in the process of medical treatment are included in this study.

Test reports- The patients who had their PFT reports, 2CT reports and 6 min walk tests are included in this study. The Pulmonary Function Test (PFT) is crucial for monitoring, and guiding treatment, measuring lung function and airflow capacity. 2 Chair Test(2CT) is used to

assess functional status and exercise capacity by measuring pulse rate (PR) and arterial oxygen saturation (SpO2) changes after five chair-to-chair movements. The 6MWT helps to understand how well a person with COPD can perform physical activity and assess the severity of their lung disease.

The Exclusion Criteria-

Age ranges- The people who are below or above from 30-80 age range were excluded from this study.

Duration- The patients who are not suffering from at least 6 months duration was not included in this study.

Area- The patients who did not visit Institute of Pulmocare & Research Clinic, West Bengal, were excluded from this study.

Diagnosis- The patients who are not clinically diagnosed with COPD and have other lung problems, diabetes, cancer or some chronic illnesses were also excluded from this study.

Medicine- The patients who were not undergoing any medical treatment process were excluded from this study.

Test reports- The patients who didn't have their PFT, 2CT or 6Minute Walk test, were not included in this study.

DESCRIPTION OF THE TOOLS

BECK DEPRESSION INVENTORY(BDI-II)- The Beck Depression Inventory Second Edition (BDI-II) is a self-report tool designed to assess the severity of depression. Developed in 1996 by Aaron T. Beck, Robert A. Steer, and Gordon K. Brown, it is used to measure depression in both adults and adolescents aged 13 and older. The BDI-II consists of 21 items. In this updated version, four items—Weight Loss, Body Image Change, Somatic Preoccupation, and Work Difficulty—were replaced with new items: Agitation, Worthlessness, Concentration Difficulty, and Loss of Energy. Additionally, two items were modified to better understand both increases and decreases in appetite and sleep.

DOMAINS- Beck Depression Inventory (BDI-II) has 21 sub domains. Which includes- "Sadness", "Pessimism", "Past failure", "Loss of pleasure", "Guilty feelings", "Punishment feelings", "Self- dislike", "Self-criticalness", "Suicidal thoughts or wishes", "Crying", "Agitation", "Loss of interest", "Indecisiveness", "Worthlessness", "Loss of energy", "Changes in sleeping pattern", "Irritability", "Changes in appetite", "Concentration difficulty", "Tiredness or fatigue", "Loss of interest in sex".

SCORING- The scoring for the BDI-II is based on the sum of the ratings for all 21 items. Every item was scored on a 4-point scale ranging from 0 to 3 ratings. The highest possible total score is 63. For item 16 (Changes in sleeping patterns) and item 18 (Changes in appetite), each has seven response options: 0, 1a, 1b, 2a, 2b, 3a, and 3b, to understand properly the difference

between increases and decreases in their behavioural or physiological changes. The score ranges are as follows: 0-13 indicates minimal depression, 14-19 indicates mild depression, 20-28 indicates moderate depression, and 29-63 indicates severe depression.

RELIABILITY-

INTERNAL CONSISTENCY- Beck et al. (1998) reported a coefficient alpha of .92 for the BDI-II in outpatient populations and .93 for the general student population. Cronbach's alpha values typically range from 0.86 to 0.93.

VALIDITY-

CONTENT VALIDITY- The BDI-II was specifically designed to assess the depressive symptoms outlined as criteria for depressive disorders in the DSM-IV.

CONSTRUCT VALIDITY- The correlation between the BDI-IA and BDI-II was found to be .93 ($p < .001$).

BECK ANXIETY INVENTORY(BAI) - Beck Anxiety Inventory (BAI) – The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) is a 21-item scale designed to measure the severity of anxiety in adults and adolescents. It was developed by Aaron T. Beck and his team at the Center for Cognitive Therapy, University of Pennsylvania School of Medicine. The BAI is specifically aimed at assessing anxiety symptoms, which are somewhat different from those of depression. Although anxiety and depression symptoms are often related, the BAI focuses on symptoms that are mainly unique to anxiety, unlike the Beck Depression Inventory (BDI), which measures symptoms related to depression.

ADMINISTRATION – It takes generally 5-10 minutes to complete. If it is self-administered but it takes 10 minutes if it is oral administration.

Direction of self -administration of BAI- This is a list of common anxiety symptoms. Please read each item carefully and mark how much you have been bothered by each symptom in the past week, including today, by placing an X in the box next to each symptom.

Direction of oral administration- This questionnaire has 21 symptoms. I will read each one aloud. After I read each symptom, please tell me if you were not bothered at all, mildly bothered, moderately bothered, or severely bothered by this symptom over the past week, including today. "Mildly" means it bothered you a little; "moderately" means it bothered you quite a lot; and "severely" means it bothered you so much that it was hard to handle.

BAI ITEMS- BAI consists of 21 items, those are – "numbness or tingling", "feeling hot", "wobbliness in legs", "unable to relax", fear of worst happening", "dizzy or lightheaded", "heart pounding/racing", "unsteady", "terrified or afraid", "nervous", "feeling of choking", "hands trembling", "shaky/unsteady", "fear of losing control", "difficulty in breathing", "fear of dying", "scared", "indigestion", "faint/lightheaded", " face flushed", and "hot/cold seats".

SCORING- The scale has 21 items, each rated from 0 to 3: where 0 indicates not at all, 1 indicates mildly, 2 indicates moderately, and 3 indicates Severely. The tot al score is the sum

of all items, with a maximum of 63 points. Based on the total score: 0–7 indicates minimal anxiety, 8–15 indicates mild anxiety, 16–25 indicates moderate anxiety, and 26–63 indicates severe anxiety level.

RELIABILITY-

INTERNAL CONSISTANCY- The test has been shown to be very reliable. Beck and colleagues (1988) reported a high internal consistency (Cronbach's alpha = .92), and Fydrich et al. (1990) found it even slightly higher (.94).

VALIDITY-

CONCURRENT VALIDITY- The test showed a strong relationship (correlation = .51, $p<.001$) with the revised Hamilton Anxiety Rating Scale and the anxiety part of the Cognition Check List, both of which measure anxiety.

CONSTRUCT VALIDITY- The test also showed a significant correlation with the Hamilton Depression Scale ($r = .25$, $p<.05$), the Beck Depression Inventory ($r = .48$, $p<.001$), and the depression part of the Cognition Check List ($r = .22$, $p<.05$). This suggests it is related to but still distinct from depression measures.

FATIGUE ASSESSMENT SCALE(FAS) - The Fatigue Assessment Scale (FAS) is a 10-question tool developed by Michielsen, De Vries, and Van Heck in 2003. It is used to measure symptoms of chronic fatigue.

PURPOSE- The FAS measure fatigue as a single issue, rather than breaking it into types. However, the questions cover both physical and mental symptoms to give a better understanding.

POPULATION OF TESTING - The scale was tested on both men and women, with average ages around 45 years for men and 43 years for women.

ADMINISTRATION- It is a self-report questionnaire, and it only takes approximate 2 minutes to complete.

RELIABILITY AND VALIDITY - The FAS is considered very reliable, with a strong internal consistency score of .90. It also matches well with other tools that measure fatigue. Some questions showed small differences between men's and women's scores, but this did not really affect the total results, so the original scoring system is still valid.

SCORING- Each question is rated from 1 (never) to 5 (always). Questions 4 and 10 are reverse scored. Total scores range from 10 (very low fatigue) to 50 (very high fatigue).

COPD ASSESSMENT TEST (CAT)- The COPD Assessment Test (CAT) was developed by Paul W. Jones, G. Harding, P. Berry, I. Wiklund, W-H. Chen and N. Kline Leidy (2009). It is a short questionnaire that patients with COPD fill out themselves. It helps to understand how much COPD is affecting a person's health and daily life. The test has 8 easy

questions, and it is easy to complete. Even though it is short, it covers many ways COPD can impact health. It works well alongside other tests like lung function (FEV1) and helps improve communication between patients and healthcare providers. Research shows it is reliable and can show changes in a patient's condition or response to treatment.

PURPOSE- The CAT is a short and easy questionnaire that patients can fill out quickly. It helps to better understand how COPD is affecting the patient's life. This makes it easier to see which areas of life are most affected and to make better decisions about the treatment. The goal is to keep the patient's health as good as possible.

POPULATION OF TESTING- The CAT is designed for all people who have been diagnosed with COPD.

ITEMS- COPD Assessment Test (CAT) is consists of 8 items, which measures about the patient's lung condition like the cough, is there any phlegm, chest tightness, breathing condition while walking up in a hill or a flight, limitedness of any work at home, confidence during leaving the house despite the lung condition, sleep condition and energy.

RELIABILITY – The study reported test-retest reliability, an intra-class correlation coefficient of 0.8, showing that the COPD Assessment Test (CAT) gives consistent and reliable results, and also found an internal consistency, Cronbach's alpha of 0.88, which means the questions in the COPD Assessment Test (CAT) are closely related and measure the same thing reliably. (Source: P.W. Jones and colleagues, European Respiratory Journal, 2009).

VALIDITY- The CAT showed a strong correlation with the St. George's Respiratory Questionnaire (SGRQ), with a score of 0.84 in a study across 7 European countries and 0.8 in a U.S. study. This means the CAT gives results similar to the well-established SGRQ, showing it is a reliable tool for measuring the impact of COPD. (Sources: Jones et al., European Respiratory Journal 2011 and 2009).

SCORING- These 8 items are rated 0-5, Ranges of CAT scores is from 0-40, where 5-10 indicates low impact, 10-20 indicates medium impact, above 20 indicates high impact and above 30 indicates very high impact on health.

CLINICAL FRAILTY SCALE (CFS)- The Clinical Frailty Scale was developed by Rockwood et al. (2005). It is now used in over 20 countries for both everyday medical care and research. The CFS is based on the Canadian Study of Health and Aging Frailty Index. After checking a patient, the CFS can be administered along with their overall impression to rate how vulnerable the person is. The scale has nine levels and looks at things like movement, energy, activity levels, and how well the person can manage daily tasks. It is a fast and simple way to judge a person's frailty.

POPULATION OF THE TESTING- The Clinical Frailty Scale (CFS) has been tested mainly in older adults. It has not been fully tested in people under 65, or in those with learning disabilities, so it might not work as well for them. It also may not be accurate for people with lifelong stable conditions like cerebral palsy, whose health outcomes are different from those with age-related decline. So, it is best not to use the CFS for these groups.

PURPOSE- The Clinical Frailty Scale (CFS) is a tool that helps measure how frail a person is. It is used to find out who might be at higher risk of health problems, so there can be better plans for their care.

SCALE- The CFS is a nine-point scale based which measures the mobility, energy, physical activity, and function of patients. The CFS score of 1 to 9 indicates very fit, fit, managing well, living with very mild frailty, living with mild frailty, living with moderate frailty, living with severe frailty, living with very severe frailty and terminally ill respectively.

RELIABILITY AND VALIDITY- Clinical Frailty Scale(CFS) is a reliable and valid tool for assessing frailty, particularly in older adults. CFS score is a valid diagnostic instrument to measure frailty in older hospitalized patients and patients in the emergency department.

PROCEDURE- The data for this study was collected from the Institute of Pulmocare and Research, located at Street Number 0327, DG 8, Action Area I, Newtown, Chakpachuria, West Bengal, 700156. A total of 30 COPD patients participated in this study. Data collection took place between 27th January 2025 and 13th March 2025. The researcher visited the institute during its official hours, from 11:00 AM to 3:00 PM, on a weekly basis. While meeting each participant, first rapport was established with the participants under study. After this informed consent was taken from each participant, ensuring that they are willingly providing their data for research purposes. Following consent, demographic and personal information, including the participant's name, age, relationship status, educational qualification, number of family members, monthly family income, and history of substance use, if any, were collected. The selected patients were enquired about their pre- and post- treatment experiences through the standardized scales used on the same day.

Once the preliminary data was collected, standardized assessment tools: COPD Assessment Test (CAT) to evaluate the severity of COPD symptoms, Beck Depression Inventory-II (BDI-II) to assess the level of depression, Beck Anxiety Inventory (BAI) to measure anxiety symptoms, Fatigue Assessment Scale (FAS) to assess fatigue levels and Clinical Frailty Scale (CFS) to evaluate frailty or vulnerability among the patients were administered. After the data collection process, all responses were scored accordingly. The statistical analysis was carried out using Jamovi software. A paired sample t-test was conducted to determine significant differences between pre-treatment and post-treatment scores of COPD-related symptoms. Additionally, the Spearman correlation test was used to identify relationships among variables, including whether substance dependency had any significant link to the development or severity of COPD. Based on the results of these analyses, conclusions were drawn to fulfil the objectives of the study.

RESULTS

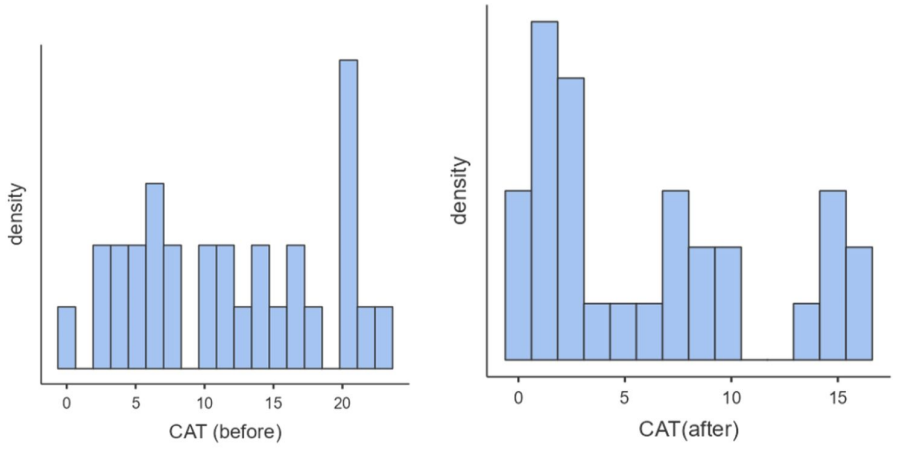
RESULTS- After calculating the Mean, Median, Mode, Standard Deviation, p- value, Paired sample t- Test, Independent sample t-Test and Spearman correlation the data analysis are shown below in the tables:

Table 1: Shows the Normality, Mean, Median, Mode, Standard deviation, of COPD Assessment Test (CAT) and this table shows the Shapiro-Wilk Test p value(N=30).

DESCRIPTIVES

	CAT (before)	CAT (after)
N	30	30
Missing	0	0
Mean	11.8	6.13
Median	11.0	4.50
Mode	20.0	1.00
Standard deviation	6.85	5.48
Minimum	0	0
Maximum	23	16
Shapiro- Wilk W	0.946	0.875
Shapiro-Wilk p	0.133	0.002

As per the is above table the Normality test was done by Shapiro Wilk Test, it can be seen that the p value of COPD Assessment Test (before) shows 0.133 which is significant in 0.05 level and considered as a normally distributed and the p value of COPD Assessment Test (after) is 0.002 which is less than the significance level 0.05 level and it is not significant and not normally distributed. Therefore, it can be said that this is not normally distributed. As one shows normally distributed and other shows not normally distributed, Paired sample t-Test were done.



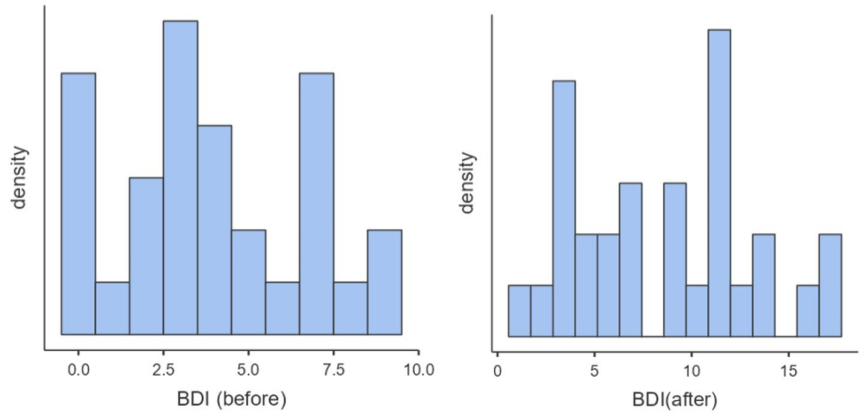
From this above bar graph there are certain differences exist between COPD Assessment Test (CAT) before and after condition.

Table 2: Shows the Normality, Mean, Median, Mode, Standard deviation, of Beck Depression Inventory (BDI-II) and this table shows the Shapiro-Wilk Test p value(N=30).

DESCRIPTIVES

	BDI-II (before)	BDI-II (after)
N	30	30
Missing	0	0
Mean	3.93	8.73
Median	3.50	9.00
Mode	3.00	12.0
Standard deviation	2.78	4.58
Minimum	0	1
Maximum	9	17
Shapiro- Wilk W	0.935	0.960
Shapiro-Wilk p	0.065	0.318

As per the above table, in the Normality test (Shapiro-Wilk test), the p value of Beck Depression Inventory-II (before) and Beck Depression Inventory-II (after) shows 0.065 and 0.318, which means both are greater than 0.05 level and it is considered as normally distributed and significant.



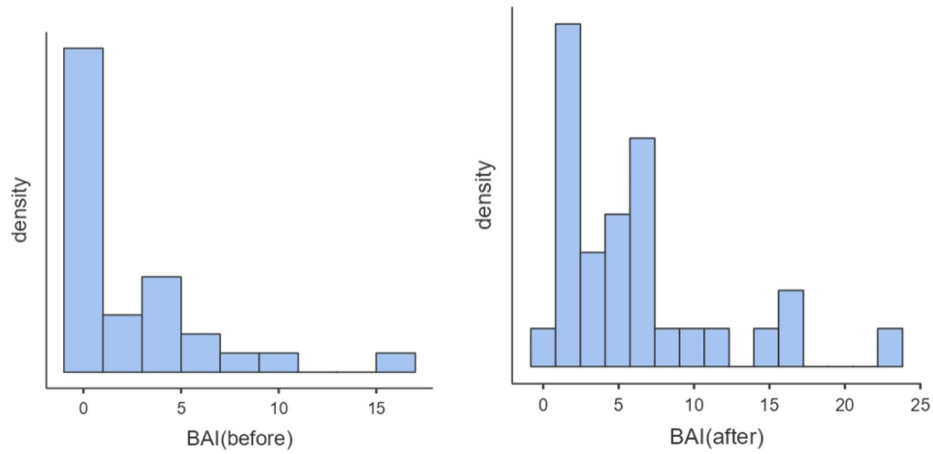
From the above bar graph it is seen that there are significant differences in depression in those COPD patients before and after treatment.

Table 3: Shows the Normality, Mean, Median, Standard deviation, of Beck Anxiety Inventory (BAI) and this table shows the Shapiro-Wilk Test p value(N=30).

DESCRIPTIVES

	BAI (before)	BAI (after)
N	30	30
Missing	0	0
Mean	2.63	6.03
Median	1.00	5.00
Standard deviation	3.71	5.46
Minimum	0	0
Maximum	16	23
Shapiro- Wilk W	0.740	0.842
Shapiro-Wilk p	<.001	<.001

As per the above -mentioned table, in the Normality Test (Shapiro-Wilk Test), for both the Beck Anxiety Inventory (BAI) before and after the score is < .001, which means in both cases the result is not normally distributed, and it is not significant though both are less than 0.05 significance level.



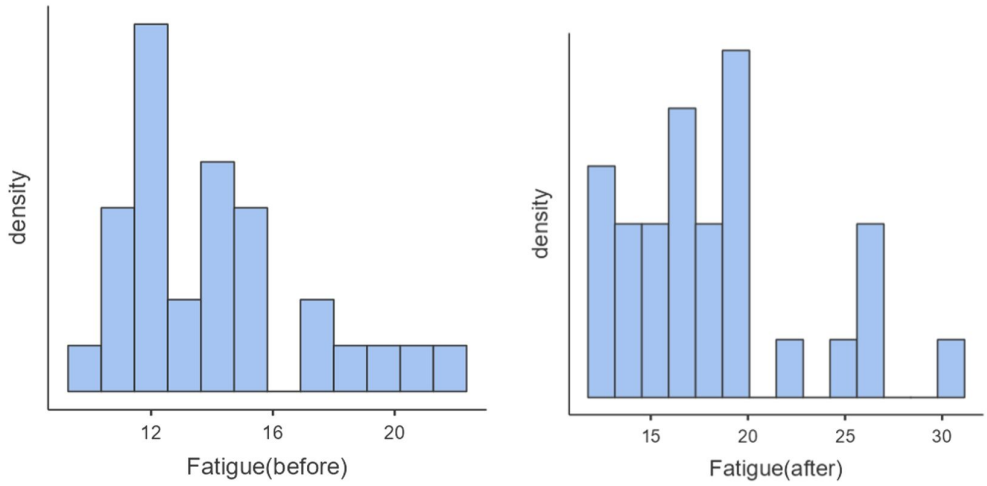
From this above bar graph, it is seen that there are significant difference exists in anxiety symptoms in those COPD patients before and after treatment.

Table 4: Shows the Normality, Mean, Median, Mode, Standard deviation, of Fatigue level and this table shows the Shapiro-Wilk Test p value(N=30).

DESCRIPTIVES

	Fatigue(before)	Fatigue (after)
N	30	30
Missing	0	0
Mean	14.1	18.2
Median	13.5	17.5
Mode	12.0	16.0
Standard deviation	3.16	4.73
Minimum	10	12
Maximum	22	30
Shapiro- Wilk W	0.871	0.900
Shapiro-Wilk p	0.002	0.008

The above-mentioned Normality test (Shapiro-Wilk Test), the p value for Fatigue Assessment Test(before) is 0.002 and Fatigue Assessment Test(after) is 0.008, which means both the results are not normally distributed and the result is not statistically significant in 0.05 level, as both are less than the significance level.



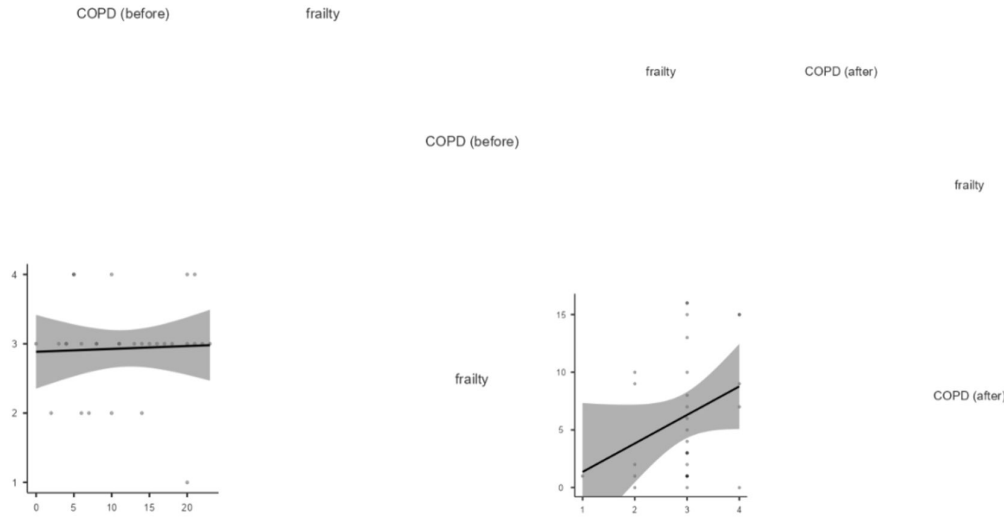
As shown in this above-mentioned bar graph, it is seen that there are significant differences exist between the fatigue score of those COPD patients before and after treatment.

Table 5: Shows the normality of the frailty scale that has been used on COPD patients to understand their vulnerability to stressors.

DESCRIPTIVES

	Frailty
N	30
Missing	0
Mean	2.93
Median	3.00
Mode	3.00
Standard deviation	0.691
Minimum	1
Maximum	4
Shapiro- Wilk W	0.798
Shapiro-Wilk p	<.001

The above- mentioned normality test of Frailty Scale shows the p value is <.001, which is less than 0.05 significance level the data is not normally distributed and not statistically significant.



The graph depicted above indicates frailty scores. It is seen that there are significant differences exist among COPD score and the frailty score of their health before and after treatment.

Table 6: Shows the Paired sample T-Test of COPD Assessment Test (CAT) before and after treatment.

Paired Sample t-Test

Paired Samples T-Test

			Statistic	P	Mean difference	SE difference
CAT (before)	CAT(after)	Wilcoxon W	347 [a]	0.001	6.50	1.53

As per the above table the statistic value COPD Assessment Test (CAT) is (347), and p value is 0.001. It means the p value 0.001<0.05 level, and it shows significant difference in results in after treatment.

Since the result shows that there is a significant difference in after treatment thus, hypothesis no1(Ho1) is rejected.

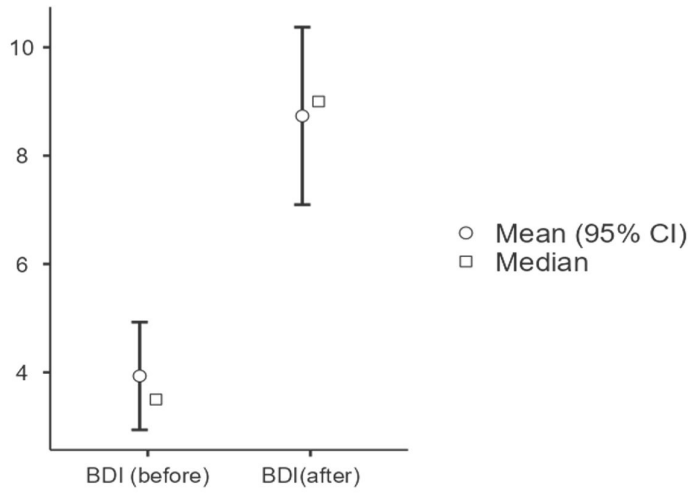
Table 7: Shows the Paired sample t-test (Student's t-Test) between the Beck Depression Inventory-II (BDI-II) before and after treatment and the graphical presentation of before and after treatment.

Paired Sample t-Test

Paired Samples T-Test

			statistic	df	p
BDI (before)	BDI(after)	Student's t	-7.37	29.0	< .001

As per this above- mentioned paired sample T-test table of Beck Depression Inventory(BDI-II) , it can be seen that the t- statistic value is (-7.37) and the p value is < .001 which means both are less than 0.05 level of significance and it indicates there is a significant difference in results before and after treatment measured by BDI-II.



The above- mentioned graphical presentation depicts the differences in mean and median before and after treatment of the COPD patients in Beck Depression Inventory (BDI-II). As it can be seen that there is a significant difference in the condition of their depression before and after treatment. Therefore, the null hypothesis 2(Ho2) is rejected.

Table 8: Shows the Paired sample t-test (Wilcoxon) between the Beck Anxiety Inventory (BAI) before and after treatment and the graphical presentation of before and after treatment.

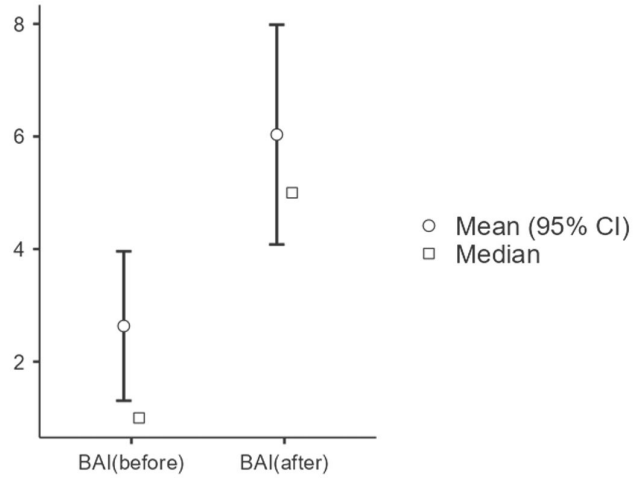
Paired Sample t-Test

Paired Samples T-Test

			Statistic	p
BAI(before)	BAI(after)	Wilcoxon W	15.0 [a]	< .001

The above-mentioned table shows that the t-statistic value of Beck Anxiety Inventory (BAI) is 15.0, it is much greater than the 0.05 significance level and shows highly statistically significant differences, and the p value is < .001 which is less than 0.05 level, it means the p

value is statistically significant and it also depicts that the patients who were given this inventory were differ significantly after the treatment.



The above-mentioned graphical presentation depicts the differences in mean and median before and after treatment of the COPD patients in Beck anxiety Inventory (BAI). As it can be seen that there is a significant difference in the condition of their anxiety before and after treatment. Therefore, the null hypothesis 3(Ho3) is rejected.

Table 9: Shows the Paired Sample t-Test (Wilcoxon) between the fatigue level of the COPD patients before and after treatment and shows the graphical presentation of the differences in before and after treatment.

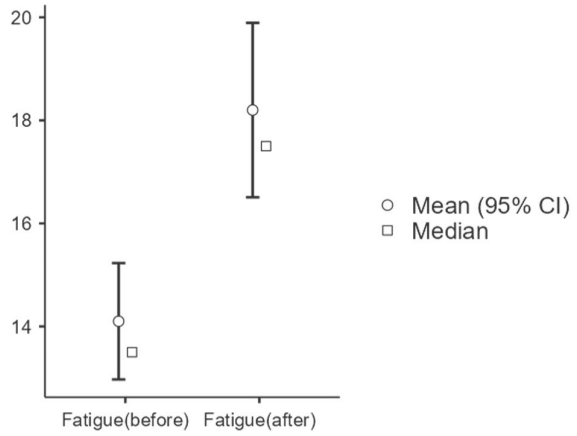
Paired Sample t-Test

Paired Samples T-Test

			Statistic	p
Fatigue(before)	Fatigue(after)	Wilcoxon W	40.5 [a]	< .001

As the above- mentioned table shows that the statistic value of Fatigue Assessment Test (FAS) is 40.5, which is greater than 0.05 level and shows strong differences between the

sample. The p value is <.001 which is less than 0.05 significance level it depicts that the fatigue level in those COPD patients shows significant differences after the treatment.



In the above- mentioned graphical representation shows the mean and median differences before and after treatment, it indicates there is strong differences exist. Therefore, the null hypothesis 4(Ho4) is rejected.

Table 10: Show correlation matrix (Spearman Correlation) between frailty scale and COPD patients before and after treatment.

Correlation Matrix

		COPD (before)	frailty
COPD (before)	Spearman's rho	—	
	Df	—	
	p-value	—	
frailty	Spearman's rho	0.091	—

Correlation Matrix

		COPD (before)	frailty
	Df	28	—
	p-value	0.632	—

AS this above- mentioned Correlation matrix shows the p value of frailty score before the treatment is 0.632, which is greater than the 0.05 level thus, it doesn't show any significant relationship between the frailty score and the COPD patient's vulnerability rate. So, the null hypothesis 5 (Ho5) is accepted.

Correlation Matrix

		frailty	COPD (after)
frailty	Spearman's rho	—	
	Df	—	
	p-value	—	
COPD (after)	Spearman's rho	0.270	—
	Df	28	—
	p-value	0.148	—

As this above- mentioned Correlation matrix shows the p value of frailty score after the treatment is 0.148, which is greater than the 0.05 level thus, it doesn't show any significant relationship between the frailty score and the COPD patient's vulnerability rate. So, the null hypothesis 6 (Ho6) is accepted.

Table 11: Shows the Independent sample t-Test (Student's t-Test) with or without substance dependence persons with COPD before the treatment.

Independent Samples T-Test

		Statistic		df	p
copd(before)	Student's t	3.53	[a]	28.0	0.001

From this above Student's t-Test the p value is 0.001 which is less than 0.05 level and it means there is a statistically significant difference exists in the patients' who abuse substances and who did not abuse substances before the treatment. So, the null hypothesis 7(H07) is rejected.

Table 12: Shows the Independent sample t-Test (Student's t-Test) with or without substance dependence persons with COPD after the treatment.

Independent Samples T-Test

		Statistic		df	P
copd (after)	Student's t	1.98	[a]	28.0	0.058

From this above Student's t-Test the p value is 0.058 which is not less than 0.05 level and it means there is no statistically significant difference exists in the patients' who abuse substances and who did not abuse substances after the treatment. So, the null hypothesis 8(Ho8) is accepted.

Therefore, it can be said that the patients' who abused substance and did not abuse substance before the treatment are shows statistically significant differences with the COPD patients' who abused substances and did not abuse substances after the treatment.

Hence, it can be said that

1. **Null hypothesis 1(Ho1) is rejected** because there exists significant differences between COPD scores of patients before and after treatment.

2. **Null hypothesis 2(Ho2) is rejected** because there exists significant difference in depression between COPD patients before and after treatment.

3. **Null hypothesis 3(Ho3) is rejected** because there exists significant difference in anxiety between COPD patients before and after treatment.

4. **Null hypothesis 4(Ho4) is rejected** because there exists significant difference in fatigue between COPD patients before and after treatment.

5. **Null hypothesis 5(Ho5) is accepted** because there is no significant relationship found between frailty and COPD scores of patients before treatment.

6. **Null hypothesis 6(Ho6) is accepted** because there is no significant relationship found between frailty and COPD scores of patients after treatment

7. **Null hypothesis7(Ho7) is rejected** because there exists significant difference between COPD patients with and without substance dependence and their COPD scores before treatment.

8. **Null hypothesis8(Ho8) is accepted** because there is no significant difference found between COPD patients with and without substance dependence and their COPD scores after treatment.

DISCUSSION

From these previously mentioned results there is a significant difference in the COPD scores of patients before and after treatment, there is significant difference in the depressive, anxiety symptoms and fatigue level in COPD patients before and after treatment. And there is also a significant difference found in those patients who abuse substances and those who do not abuse substances before the treatment. Furthermore, the result also shows that there are no significant differences in between frailty score and COPD score before and after the treatment and there is no significant relationship with COPD scores in those patients with or without substance abuse after the treatment.

The above findings show a difference in the variables studied pre- and post-treatment among the patients observed. This maybe due to the patients' lack of care on their health. Depression is mostly common in older patients with chronic illness so this is one of the reasons of getting significant differences in formation of depressive thoughts, feelings of hopelessness, worthlessness, The anxiety with chronic illness is also somewhat related because it makes someone tense for their future treatment, and those who are generally become very anxious or having nerve problems they are more prone to have anxiety in this chronic illness situation. Fatigue is also related to depression and anxiety both and it is also a common problem for older people who are facing some chronic medical illness like lung problems or respiratory issues. Therefore, it is common to have tiredness, lack of energy for doing everyday work, or laziness after doing small things. In this research study with COPD patients Clinical Frailty Score indicates the vulnerability of those patients, as there has been found no such significant relationship between the COPD score and frailty score there may be some reason behind which includes they may have maintained proper hygiene, they may have proper resources to provide sufficient support that led them to experience lesser frailty than expected. As this study findings show there is also a significant difference found in COPD patients who abuse any substances before their treatment because it is common that smoking is a leading cause of any lung problems. Those patients who smoked too much or had alcohol consumptions history are more prone to have lung problems or respiratory problems.

CAT AND COPD

A study by Papaioannou et al., (2014), aimed to see how the COPD Assessment Test (CAT) score changed in COPD patients after one year of treatment, and to explore how the score was linked to other health factors and lung function. The study was conducted by 25 general practitioners (GPs) in Northern Greece. It involved 1,078 male patients, all aged 65 or older, who visited these GPs between March 1 and May 31, 2009. These patients underwent spirometry tests using a handheld Piko-6 Flow Meter to screen for COPD. The study excluded patients with other serious respiratory diseases, those who had previously used inhalers, or had uncontrolled heart disease. The CAT test used in the study includes 8 questions, with each item scored from 0 to 5, giving a total score ranging from 0 to 40. The score is categorized as follows: 1-10 is low impact, 11-20 is medium impact, 21-30 is high impact, and 31-40 is very high impact. To analyze the results, the researchers used several statistical tests, including a paired sample T-test to compare scores before and after treatment, Chi-Square tests for comparing proportions, and General Linear Models to assess how CAT scores were linked to lung function (measured by FEV1). The study found that most patients were male, over 70 years old, had a history of smoking, and were classified in the early stages of COPD (GOLD stages I and II).

After one year, there was a significant decrease in the number of worsening symptoms, and fewer patients visited their GPs. The CAT scores showed a significant drop over the year, with more severe scores linked to worse health status and higher GOLD stages. CAT scores were also significantly related to lung function (FEV1), and to the number of hospitalizations and days spent in the hospital. The study also found that patients with higher CAT scores were more likely to visit their GPs.

The present study shows that COPD Assessment Test (CAT) is a preferable tool to understand the level of COPD, as shown in this previously mentioned research study. How much they are incapable of doing their own work, daily life activities are also depicted by this scale and this present study shows the graphical representations where it is evident that CAT scores are showing significant differences of those patients with pre-treatment and post-treatment. As this above-mentioned research study found COPD patients with higher CAT scores are more likely to go to doctors is also evident in this present study. The previous research study shows that if the COPD patients do not maintain their healthy lifestyle, they are more prone to relapse and worsen health outcomes as the present research findings show also. However, though this previous research study does not talk about the treatment process, but we can assume that the condition of those patients was either critical or much better, i.e., why there are significant differences come before and after treatment process as the result suggests Thus, the findings of this study with COPD patients are not much different from previous studies, so the above-mentioned research supports the findings of this present research.

COPD AND FRAILTY

Research conducted by Chin et al. (2023), aimed to compare two ways of measuring frailty between the Hospital Frailty Risk Score (HFRS) and the Clinical Frailty Scale (CFS) in patients with COPD who were in the hospital. They wanted to see how closely these two tools agreed and how well the HFRS could detect failure compared to the more commonly used CFS. The study took place in the respiratory ward at The Ottawa Hospital in Ontario, Canada. It included adult patients with COPD who were hospitalized due to relapses between December 2016 and June 2019. There were no specific rules for those who could not take part. Frailty was measured in two ways, CFS ranks frailty from 1 (very fit) to 9 (terminally ill). For this study, similar categories were grouped together to make analysis easier. HFRS uses medical history and hospital codes (ICD-10) to give a frailty score, which is under 5 = low risk, 5–15 = moderate risk, and over 15 = high risk. Researchers analyzed the data in March 2022 using SAS software. They looked at the patients' ages, other health problems, and how frail they were. Different statistical tests were used to compare the groups. They used the CFS as the "gold standard" because it is widely trusted. They then checked how good the HFRS was at understanding frail and non-frail patients. According to the results, the HFRS correctly identified frail patients only 27% of the time (low sensitivity), but it was 93% accurate at identifying people who were not frail (high specificity). For example, out of 33 people labeled as "vulnerable" by the CFS, 24 were also marked as moderate or high frailty risk by the HFRS. Some key findings were, most participants were women, aged between 66 and 71. Older patients were more prone to frail. Heart disease was common, seen in 40 patients. People who were frailer also had more other health issues.

As the above-mentioned study findings show that older people are more prone to frailty who have COPD, it is also to some extent evident in this present research findings also. The individuals aged 60-80 years old are more prone to be frail. In this present study it is also evident that if someone has any other chronic health issues may show frail to any health issues. Though this study does not include much woman participants it is not clear that women are also much more vulnerable to any health-related condition, and this above-mentioned study may does not support the present findings. However, though this previous research study does not talk about the treatment process, but we can assume that the condition of those patients was either critical or much better, i.e., why there are significant differences come before and after treatment process as the result suggests. Previously mentioned graphical representations show significant differences in frailty score in COPD patients pre and post treatment which are partially supported by this previous research study.

COPD AND ANXIETY

Research conducted by Eisner et al., (2010), was aimed to define the role of anxiety in COPD patients that studied an inter-relationship between anxiety and COPD in a larger cohort group including control groups. They included the FLOW (function, living, outcomes & work) study of COPD. They included COPD patients who were stable by using medications, and the control groups included in this study were 302 subjects, matching their age, sex, and ethnicity. For measuring anxiety, they used the Hospital Anxiety and Depression Scale (HAD-S). It has 7 items measuring anxiety and the score ranges from 0-21, the higher score indicates a higher level of anxiety. The COPD severity was measured by overall five aspects: respiratory symptoms, systemic corticosteroid use, other COPD medication use, intubation for respiratory disease of home oxygen use. Possible total scores range from 0-35, higher score denotes more severe COPD. This study also includes the BODE Index, the degree of airflow obstruction (O) measured by Forced Expiratory Volume, Grade of dyspnoea(D) assessed by the modified Medical Research Council (MRC) Dyspnoea Scale & exercise capacity (E) measured by six-minute walk test, for each of item total score ranges from 0-10 points (high score means greater severity). For assessing the respiratory problem, they used the American Thoracic Society (ATS) Guidelines. The result shows that greater disease severity is highly related to proven anxiety in the patients. It is also noticed that a higher risk of dyspnoea can increase the risk of anxiety. The BODE Index shows that the COPD severity score is highly associated with anxiety. This study reinforces the fact that anxiety hurts COPD patients. They suggested that further research should determine whether proper treatment of anxiety can decrease the severity of COPD or not.

From the present research study, the result shows there are significant differences exist in anxiety symptoms between pre-treatment and post treatment of those COPD patients. As this above-mentioned research study shows disease severity is related to anxiety it is also evident in this present research work as well, and older people are highly prone to feel anxious as the result shows from previous research work and the present research study. Though this previous research study does not talk about the treatment process, but we can assume that the condition of those patients was either critical or much better i.e., why there are significant differences come before and after treatment process as the result suggests. Thus, previously done research study findings support this present research study.

COPD AND DEPRESSION

Research performed by Schane et al., (2008), with COPD patients, aimed to study the prevalence of depressive symptoms in COPD using a depressive symptom complex inventory, secondly to determine if the prevalence of depressive symptoms identified in this sample is higher in patients with COPD when compared to other chronic conditions and thirdly, to identify the risk factors that are associated with depressive symptoms in persons with COPD. The total sample size of this study was 18,588, age range was 50 and older, they interviewed these subjects in the 2004 wave of the Health and Retirement Survey (HRS), a nationally representative population-based study. 1,736 patients reported having COPD. The depressive symptoms were assessed by using the Center for Epidemiologic Studies Depression eight-item scale (CES-D8), an eight-item scale that is an abridged version of the CES-D20. The statistical measures were done by weighted logistic regression to measure the prevalence of depression in COPD patients and without COPD patients and to minimize the analytical biases they combined the data in a STATA 9.2 using the ice package. The result showed that patients with COPD are more likely to be white, high weight, single, and currently, have smoking habits rather than those without COPD. They are more prone to have comorbid heart diseases like stroke, heart failure, hypertension, diabetes etc. 58% of persons with COPD complained of dyspnoea. The result also showed that persons with COPD had higher depressive symptoms than persons without COPD as well as they had a similar risk of depressive symptoms as persons who had congestive heart failure. Respiratory issues are the main predator of having more depressive symptoms even after adjusting for other factors, dyspnoea and difficulty in walking were major factors that are associated with depression in COPD patients. The strengths of this study were that it supports the association between COPD and depressive symptoms, and there is a connection between smoking and COPD also, but depression can further provoke someone to smoke. The limitations of this study were that the diagnosis of COPD was confirmed by self-report but not any spirometry tests, while they were assessing the depressive symptoms by using questionnaires further psychometric assessments were done for formal diagnosing the clinical depression, little data exist on outcomes in COPD patients with co-morbid depressive symptoms who undergo either pharmacological treatment or psychiatric counselling, and the HRS does not provide specific information on pharmacologic treatment for depressive symptoms in patients who carry the diagnosis of clinical depression.

The above-mentioned study shows the person who are having chronic heart disease, diabetes or any respiratory problems they are more prone to have depressed mood. The present research work also shows that depression is common in older adults with respiratory problems and there are also significant differences found before and after treatment of COPD. Though this previous research study does not talk about the treatment process, but we can assume that the condition of those patients was either critical or much better i.e., why there are significant differences before and after treatment process. So, this research findings supports the present research work with COPD patients with their pre and post treatment. Furthermore, the present research work does not justify whether the included patients had any comorbidity or not, in that case it can be helpful for the further research work purpose. Thus, this previous research study too much extent supports this present research study.

COPD AND FATIGUE

Research conducted by Goërtz et al., (2019), to compare the levels of fatigue in COPD patients and non-COPD patients to compare the fatigue level, demographics, clinical features of this disease and the disease severity. It was a cross-sectional study; the patients who are included in this study were diagnosed by GOLD (Global Initiative for Chronic Obstructive Lung Disease) guidelines. A total number of 1290 patients were included including non-COPD patients. In this study fatigue was measured by the subjective fatigue subscale of the Checklist Individual Strength (CIS-Fatigue), it has eight items and is a seven- seven-point Likert-type scale, with scores ranging from 8-56. They also collected data on those participants' BMI, smoking status, and sociodemographic status and for measuring COPD condition they used the COPD Assessment Test (CAT). The data were analyzed in SPSS software. To understand the difference in results between COPD and non-COPD patients they performed the Chi-Square test, Mann- Whitney test was used for independent groups, and they also performed a non-parametric Spearman's rank correlation. The result showed that severe fatigue is present in COPD patients, but it is poorly associated with airflow limitation of the patients, also they found no clear associations between fatigue and demographic details, clinical features & disease severity.

From the above research findings, it is evident that fatigue is very common symptoms of COPD patients, but it does not associate with breathing problems as find by the present research work also with COPD patients in pre and post treatment. The present research work finds the result that fatigue is also a very common symptoms in older patients with cardiac or respiratory problems, which is also find by the previous studies. However, though this previous research study does not talk about the treatment process, but we can assume that the condition of those patients was either critical or much better, i.e., why there are significant differences come before and after treatment process as the result suggests, so this research findings supports the present research work with COPD patients with their pre and post treatment.

COPD AND SUBSTANCE ABUSE

Research done by Alanazi et al., (2021), to find out how common substance use, and misuse is among adults with COPD (Chronic Obstructive Pulmonary Disease) in the U.S., and how different factors like stress and gender might affect this relationship. They used data collected from 2015 to 2019 through the National Survey on Drug Use and Health (NSDUH), which is a national survey. Out of the 282,768 people surveyed, only those 18 years and older were included, resulting in a final sample of 67,908 participants. To identify people with COPD, the researchers used a yes/no question (yes = 1, no = 0). For smoking and substance use, the study looked at whether people had used substances like cigarettes, cigars, pipes, smokeless tobacco, alcohol, marijuana, cocaine, heroin, and others in the past month. Responses were also simplified into yes or no categories. They also asked about substance misuse, which meant using prescription drugs in any way not directed by a doctor. Only those who answered "yes" to misuse were marked as such; all other responses were treated as "no." Serious psychological distress in the past month was also included as a factor in the analysis and was measured using the Kessler Psychological Distress Scale. The researchers used STATA/SE 17.0 to analyze the data and adjusted the results to reflect the five years of survey data. They used statistical tests

to compare people with and without COPD. The results showed that people with COPD were usually older, had lower income, and were more likely to have serious psychological distress. They were also more likely to smoke cigarettes and use pipe tobacco, but not smokeless tobacco. People with COPD used more marijuana and less alcohol. They were also more likely to misuse substances, especially if they were experiencing psychological distress. The study suggests that more long-term research is needed to understand what causes these patterns and how to design better treatment and prevention strategies for people with COPD.

From the above-mentioned research study shows that older people with COPD are more likely to feel distress and they are also more likely to used substances like tobacco. The result of present research work shows that there are significant differences in COPD patients who abuse substances and who did not abuse substances before the treatment. It depicts those substances like tobacco, cigar is not good for patients with respiratory issues or any serious lungs problem. As this previously mentioned research study also shows It is also evident in studies that people with distress also can misuse the substances that can also lead their health in a worst condition. However, though this previous research study does not talk about the treatment process, but we can assume that the condition of those patients was either critical or much better, i.e., why there are significant differences arise before and after treatment process as the result suggests. Thus, this previous mentioned research study supports the present research work done with COPD patients.

These above-mentioned studies are related to the present topic of the research where depression, anxiety, fatigue level was measured COPD patients with their pre- and post-treatment and their frailty level were also taken. Though there are many researchers who studied different kinds of variables with COPD patients there were certain differences or changes found in this present study which is not similar from that previous research. The differences in using the scales of Beck Depression Inventory-II, Beck Anxiety Inventory and for measuring fatigue Assessment Scale are mentioned in this study.

CONCLUSION

CONCLUSION

It is obvious that older people will be more vulnerable in any critical situation but if they had any chronic respiratory problems or lung function problems, they would suffer more. From the current research findings it can be seen that patients with COPD show significant differences in COPD scores before and after treatment. There are significant differences in depressive thoughts, anxiety and fatigue levels before and after the treatment process. And there are significant relationships between substance abuse and developing COPD, though it is quite expectable that smoking or any substance abuse for many years can frail the patients significantly. But furthermore, the findings also suggest that there is no significant relationship found with frailty score and COPD level in those patients before and after treatment. From previous research findings in review of literature and discussion part it is seen that depression is present in those COPD patients. The patients show pessimism, sadness, guilt feelings, agitation on a significantly different manner, they also showed difficulty concentrating, changes in sleep pattern and appetite and the previous studies also follow these trends. The result of COPD patients with anxiety depicted that there is a significant difference also in pre- and post- treatment. As it is very normal to feel tensed or being anxious in certain situations, but for older persons these chances become higher and especially if they are suffering from any chronic respiratory illness like COPD.

The present study findings show there are presence of trembling in hands and legs, breathing problems, indigestion and sweating in those COPD patients. Past research also show that there is presence of anxious feelings and worry in COPD patients. Moreover, fatigue is also correlated with respiratory problems, anxiety and depression. The present study shows significantly different scores in pre- and post- treatment. It is evident that a person who is depressed will show fatigue or tiredness. This study finds the maximum patients shows fatigue before the treatment process started. Anxiety feelings are also more common for older adults while they feel fatigue in a daily basis. Past research also follows these trends. Moreover, the present study also compares the differences between COPD level with their frailty scores. It was found that frailty shows no significant differences pre- treatment and post- treatment. This study also found if there were any substance abuse records present in those COPD patients and it shows there is significantly differences in before the treatment but not the after. It indicates that those patients who used to smoke before diagnosing the COPD, these might be a reason for developing the disease because definitely smoking or tobacco using is not a healthy routine of those individuals who had any familial history of biological differences.

Finally, it can be concluded that COPD patients show significant differences in scores on depression, anxiety and fatigue before and after the treatment. However, there were certain limitations encountered while carrying out this research work.

LIMITATIONS-

The limitation of this study includes,

- The time of data collection process was so limited that it was not possible to collect data in intervals or provide information after patient follow ups.
- The number of sessions for pre- and post- treatment of patients was not fixed.
- Data was collected based on subjective experiences of patients at a single encounter.
- The study population was also small (N=30) that sometimes does not include all kinds of patients who are suffering more chronic issues, and it may sometimes create bias.
- The data collection was done only from one institute in Newtown area, where limited patients have come.
- This study was a cross-sectional study, though it was not longitudinal study there are chances that it does not include all types of situations of those patients.
- There is a limited amount of research done with COPD patients with before and after treatment, that might sometimes give less information about the research findings.
- This study does not include any comorbidities of those patients that may precipitate the COPD.

SCOPE-

This study suggests further research with COPD patients with before and after treatment to understand thoroughly the differences between depression, anxiety and fatigue level in larger population with proper time period and follow ups that will ensure the result findings more accurately of the patients which is not maintained in this research study. Frailty as a variable should be studied further with COPD patients for better understanding of the relationship between the scores and the vulnerability of those patients.

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APPENDIX-

INFORMED CONSENT

PURPOSE OF THE STUDY- This dissertation research is being conducted as a part of my post graduate course in Applied Psychology from the department of psychology in Sister Nivedita University. The purpose of the research is to understand the psychosocial variables of COPD individuals that might play an additive role towards in health conditions of the participants.

STUDY PROCEDURES- If you volunteer to participate in this research, you will be asked to provide some response to several questions of some questionnaires, those questionnaires will depict your anxiety, depression, fatigue level and measure COPD level. To complete each questionnaire, you may need 10-15 minutes for each, and the total duration will be around 30 minutes.

RISKS- No such risks or discomfort will be entertained in this research.

BENEFITS OF THE RESEARCH- This study will not directly benefit to you and your participation in this research, but I hope your participation and honest response will give a considerable benefit solely for the purpose of the research and gain knowledge for further studies in this field.

CONFIDENTIALITY- All information that you will be giving during the research study will remain confidential, your name and identity details will not be disclosed in any report or publication. Your data will be solely stored and will only be used in research purposes.

VOLUNTARY PARTICIPATION- Your participation in this study is voluntary. It is up to you to decide whether to take part in this study. If you decide to take part, you will be asked to sign a consent form, after your sign the consent form you are still free to withdraw at any time, withdrawing from this study will not affect the relationship with the researcher.

CONSENT- I have read, and I understand the provided information and I have had the opportunity to ask questions. I understand that my participation is voluntary, and I am free to withdraw at any time. Regardless, I voluntarily agree to take part in this study.

PARTICIPANT'S SIGNATURE_____

DATE -_____

INVESTIGATOR'SSIGNATURE_____

DATE-_____

INFORMATION SCHEDULE

NAME –

AGE-

GENDER- Male/ Female/ Other/prefer not to say

ADDRESS-

EDUCATION QUALIFICATION-

MARITAL STATUS- Marries/Unmarried/Widow

OCCUPATION-

FAMILY TYPE- Nuclear/ Extended/ Separated

NUMBER OF FAMILY MEMBERS-

MONTHLY FAMILY INCOME-

ANY DIAGNOSIBLE PSYCHOLOGICAL ILLNESS – Yes/No

If yes, the, specify-

ANY RECENY HISTORY OF PSYCHOLOGICAL TRAUMA (IN 6 MONTHS)- Yes/No

If yes, then specify –

ANY HISTORYOF SUBSTANCE DEPENDENCE - Yes/No

If yes, then specify-

Scale 1

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully. And then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

0. I do not feel sad.

1. I feel sad much of the time.

2. I am sad all the time.

3. I am so sad or unhappy that I can't stand it.

2. Pessimism

0. I am not discouraged about my future.

1. I feel more discouraged about my future than I used to.

2. I do not expect things to work out for me.

3. I feel my future is hopeless and will only get worse.

3. Past Failure

0. I do not feel like a failure.

1. I have failed more than I should have.

2. As I look back, I see a lot of failures.

3. I feel I am a total failure as a person.

4. Loss of Pleasure

0. I get as much pleasure as I ever did from the things I enjoy.

1. I don't enjoy things as much as I used to.

2. I get very little pleasure from the things I used to enjoy.

3. I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings

0. I don't feel particularly guilty.

1. I feel guilty over many things I have done or should have done.

2. I feel quite guilty most of the time.

3. I feel guilty all of the time.

6. Punishment Feelings

0. I don't feel I am being punished.

1. I feel I may be punished.

2. I expect to be punished.

3. I feel I am being punished.

7. Self-Dislike

0. I feel the same about myself as ever.

1. I have lost confidence in myself.

2. I am disappointed in myself.

3. I dislike myself.

8. Self-Criticalness

0. I don't criticize or blame myself more than usual.

1. I am more critical of myself than I used to be.

2. I criticize myself for all of my faults.

3. I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

0. I don't have any thoughts of killing myself.

1. I have thoughts of killing myself, but I would not carry them out.

2. I would like to kill myself.

3. I would kill myself if I had the chance.

10. Crying

0. I don't cry anymore than I used to.

1. I cry more than I used to.

2. I cry over every little thing.

3. I feel like crying, but I can't.

11. Agitation

0. I am no more restless or wound up than usual.

1. I feel more restless or wound up than usual.

2. I am so restless or agitated, it's hard to stay still.

3. I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0. I have not lost interest in other people or activities.

1. I am less interested in other people or things than before.

2. I have lost most of my interest in other people or things.

3. It's hard to get interested in anything.

13. Indecisiveness

0. I make decisions about as well as ever.

1. I find it more difficult to make decisions than usual.

2. I have much greater difficulty in making decisions than I used to.

3. I have trouble making any decisions.

14. Worthlessness

0. I do not feel I am worthless.

1. I don't consider myself as worthwhile and useful as I used to.

2. I feel more worthless as compared to others.

3. I feel utterly worthless.

15. Loss of Energy

0. I have as much energy as ever.

1. I have less energy than I used to have.

2. I don't have enough energy to do very much.

3. I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

0. I have not experienced any change in my sleeping.

1a I sleep somewhat more than usual.

1b I sleep somewhat less than usual.

2a I sleep a lot more than usual.

2b I sleep a lot less than usual.

3a I sleep most of the day.

3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability

0. I am not more irritable than usual.

1. I am more irritable than usual.

2. I am much more irritable than usual.

3. I am irritable all the time.

18. Changes in Appetite

0. I have not experienced any change in my appetite.

1a) My appetite is somewhat less than usual.

1b) My appetite is somewhat greater than usual.

2a) My appetite is much less than before.

2b) My appetite is much greater than usual.

3a) I have no appetite at all.

3b) I crave food all the time.

19. Concentration Difficulty

0. I can concentrate as well as ever.

1. I can't concentrate as well as usual.

2. It's hard to keep my mind on anything for very long.

3. I find I can't concentrate on anything.

20. Tiredness or Fatigue

0. I am no more tired or fatigued than usual.

1. I get more tired or fatigued more easily than usual.

2. I am too tired or fatigued to do a lot of the things I used to do.

3. I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0. I have not noticed any recent change in my interest in sex.

1. I am less interested in sex than I used to be.

2. I am much less interested in sex now.

3. I have lost interest in sex completely.

Total Score: _____

Scale 2

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not at all	**Mildly, but it didn't bother me much**	**Moderately- it wasn't pleasant at times**	**Severely- It bothered me a lot**
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding / racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot / cold sweats	0	1	2	3

Scale 3

The following 10 statements refer to how you usually feel. For each statement you can choose one out of five answer categories, varying from *never* to *always*. 1 = *never*; 2 = *sometimes*; 3 = *regularly*; 4 = *often*; 5 = *always*.

	Never	Sometimes	Regularly	Often	Always
I'am bothered by fatigue (WHOQOL)	1	2	3	4	5
I get tired very quickly (CIS)	1	2	3	4	5
I don't do much during the day (CIS)	1	2	3	4	5
I have enough energy for everyday life (WHOQOL)	1	2	3	4	5
Physically, I feel exhausted (CIS)	1	2	3	4	5
I have problems starting things (FS)	1	2	3	4	5
I have problems thinking clearly (FS)	1	2	3	4	5
I feel no desire to do anything (CIS)	1	2	3	4	5
Mentally, I feel exhausted	1	2	3	4	5
When I am doing something, I can concentrate quite well (CIS)	1	2	3	4	5

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Scale 4

This questionnaire will help you and your healthcare professional to measure the impact that COPD (Chronic Obstructive Pulmonary Disease) is having on your wellbeing and daily life. Your answers and test score can be used by you and your healthcare professional to help improve the management of your COPD and gain the greatest benefit from the treatment. If you wish to complete the questionnaire by hand on paper, please click here and then print the questionnaire. For each item below, place a mark (X) in the box that best describes your current situation. Please ensure that you only select one response for each question.

								SCORES
I Never cough	0	1	2	3	4	5	I cough all the time	
I have no phlegm (mucus) on my chest at all	0	1	2	3	4	5	My chest is full of phlegum (mucus)	
My chest does not feel tight at all	0	1	2	3	4	5	My chest feels very tight	
When I walk up a hill or a flight of stairs I am not out of breath	0	1	2	3	4	5	When I walk up a hill or a flight of stairs I am completely out of breath	
I am not limited to doing any activities at home	0	1	2	3	4	5	I am completely limited to doing any activities at home	
I am confident leaving my home despite my lung condition	0	1	2	3	4	5	I am not confident leaving my home despite my lung condition	
I sleep soundly	0	1	2	3	4	5	I do not sleep soundly because of my lung condition	
I have lots of energy	0	1	2	3	4	5	I have no energy at all	

TOTAL SCORE

Scale 5

Instructions: Determine the person's baseline health state. From here, ask the patient or caregiver about four features: how the patient moved, functioned, thought, and felt about their health over the last two weeks. Scoring should match the description and should not be based solely on the pictures that accompany each level.

1 Very fit

People who are robust, active, energetic and motivated. They tend to exercise regularly and are among the fittest for their age.

2 Fit

People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g., seasonally.

3 Managing well

People whose medical problems are well controlled, even if occasionally symptomatic, but often are not regularly active beyond routine walking.

4 Living with very mild frailty

Previously "vulnerable, this category marks early transition from complete independence. While not dependent on others for daily help, often symptoms limit activities. A common complaint is being "slowed up" and/or being tired during the day.

5 Living with mild frailty

People who often have more evident slowing, and need help with high order instrumental activities of daily living (finances, transportation, heavy housework). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation, medications and begins to restrict light housework.

6 Living with moderate frailty

People who need help with all outside activities and with keeping house. Inside, they often. have problems with stairs and need help with bathing and might need minimal assistance (cuing standby) with dressing.

7 Living with severe frailty

People who need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing standby) with dressing.

8 Living with very severe frailty

Completely dependent for personal care and approaching end of life. Typically, they could not recover even from a minor illness.

9 Terminally ill

Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise living with severe frailty. (Many terminally ill people can still exercise until very close to death.)

Clinical frailty scale score: _____.